CHEMICAL MARKETS

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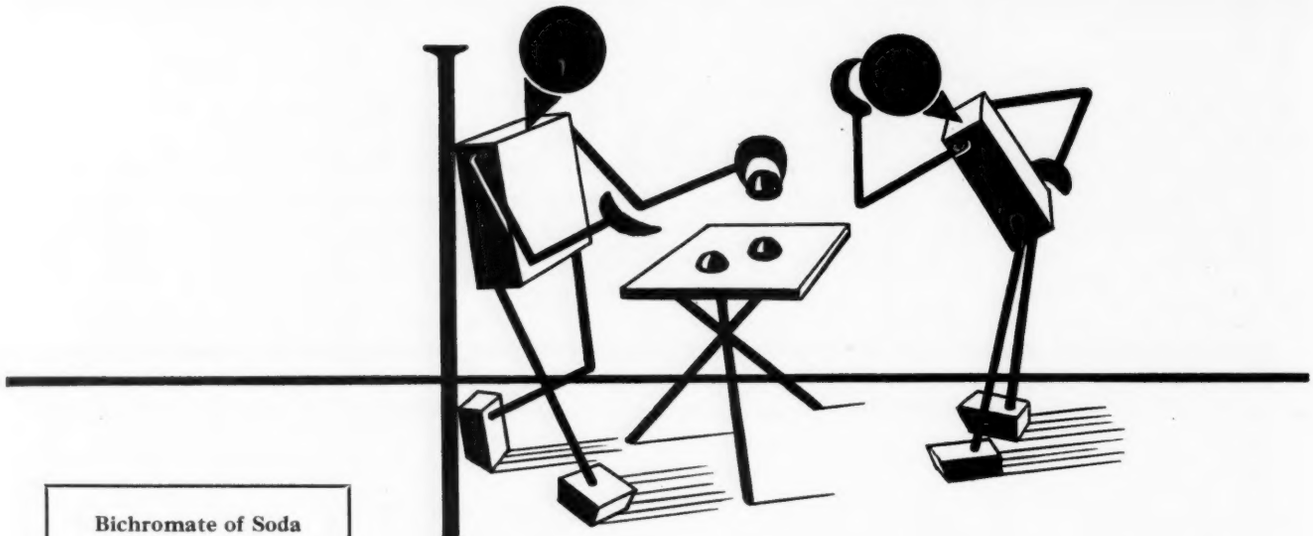
Doles and Duties

THERE are styles in political thought, which change almost as swiftly as in women's clothes, which are more costly, and which, while they no more effect fundamental principles than the length of a skirt changes human nature, do have great, immediate effects upon business. The Farm Board could not possibly tamper successfully with the world prices of agricultural staples. The splendid graft of the American Legion did not end the depression. Yet these fashionable bits of legislation were hailed by our political Beau Brummels as the last word in relief. We all know that they were expensive extravagances just about as useful as a pair of green lizard-skin slippers.

YOU need not be a Worth or a Poiret to forecast some of the political styles that will be introduced in Washington next season. There will be a dazzling parade of mannikins displaying all sorts of plain and fancy doles for the unemployed. Under most elite patronage a grand opening will be held of bonus cloaks to hide the naked greed of treasury raiders. A *salon de luxe* will exhibit the newest style in tariffs, the old modes of Jefferson and Wilson furbished up with up-to-date trimmings of international co-operation.

DOLE proposals and a revision of the tariff downwards are inevitable topics for the next Congress. Thousands of men are out of work, utterly unable to secure employment, who never before faced this bitter situation. What is more natural than that they should turn to the Federal Government for relief? They have recent precedent enough, and they will find enough vote seekers and Administration obstructionists to present their pleas. England's experience will weigh as little with these as Brazil's coffee experiment did with the Farm Board advocates. Lower tariff has been in the air some time, and the theoretically perfect case for free trade will be tellingly put forward with reckless disregard of the fact that every industrial nation in the world is today raising tariff walls to foster their own industries and keep their own populations busy.

WE HAVE heard a great deal of late about the need for American industry to plan and organize to execute a program of sound reconstruction. It reminds us of the talk of dress reform. We shall doubtless struggle along, unwilling victims of the style makers. We shall be the greater fools because we know just about what we may expect.



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Spiritless Bidding Seven bidders for the Muscle Shoals nitrate plant, and more of them representing power than chemical interests, indicates quite clearly that the true worth of this white elephant of the Government is very thoroughly understood. It is hardly to be expected that the Allied interests would feel that it was worthwhile to make an investment in the obsolete Alabama plant simply to protect their own investment at Hopewell, but it is interesting to note that American Cyanamid, who of all chemical operating companies in a position to even consider an enterprise of the magnitude of Muscle Shoals is certainly a most logical bidder, has not as yet submitted figures. It is also interesting to note that Mr. Ford, the original bidder of all, is conspicuous by his absence, and that none of the cooperative farmers' organizations, who were expected to grasp eagerly at this opportunity to go into the fertilizer business on their own account, have as yet submitted a bid.

While it is encouraging to the fertilizer and chemical industries to note this proper appreciation of the economics of Muscle Shoals, as revealed by the bidding, there is, nevertheless, a danger in the lack of interest displayed. If the efforts of Congress to dispose of the plant become frantic, it is possible that terms will be granted so extremely favorable as to amount to a very substantial subsidy to the operator. If Mr. Hobb's committee were hopeful that this call for bids was going to be the final and satisfactory solution to the problem, they must by now be thoroughly disillusioned.

Market or Menace? There is no truth in Russia. That is, in part, why she has furnished material for endless debate which leads seemingly only to violent partisanship. One simply cannot be indifferent to so huge, so exciting, so contradictory a fact—but what fact ?

The Soviets and their Five-year Plan have been the most frequently written about and freely discussed current topic for the past year, yet the conclusions drawn have been extremely unsatisfactory. With chemicals an important section of their industrialization scheme, it is necessary to reckon with them in any plans of our own for the next ten years, and a good deal will undoubtedly depend upon our ability to determine correctly and well in advance whether we shall regard them as profitable customers or implacable enemies.

It is possible to muster a few definite facts and dependable figures helpful in forming an opinion. Whatever the ideals or motives of the Five-year Plan, its practical financing, since foreign loans or long-term credits were plainly impossible, was predicted upon the export of the products of Russian forests, mines, and farms. The cascade of commodity prices during the past two years has therefore been quite as serious a problem for Stalin and his aides as for the financiers and industrialists of the despised capitalistic world. More than this, Russian wheat exports—despite all the hullabaloo of last winter—have actually declined from a pre-war average of 165 million bushels to 93 million for the season ending last August first: and this in the face of a record for-all-time crop of one billion and 94 million bushels, and of the vital withdrawal of our American exportable surplus from world competition, thanks to the price pegging of our Farm Board. The breakdown of foreign sales of that very commodity of which Russia has long been the world's greatest seller is indicative of the difficulties which the Soviets are facing. Furthermore, it is plain that the progress of the Five-year Plan has not been up to schedule; and, what is vastly more significant, the industrial system it would introduce is illy fitted to meet Russian conditions as they exist. The inadequacy of transportation, the lack of technically trained men, the ineptness of the worker, the general lack of industrial experience, organization and discipline are difficulties as real as lack of capital. Time can surmount these obstacles. But it is doubtful whether the Soviets have cash or credit, granting they have the courage and endurance, to persist until such time as their system will work with sufficient smoothness to produce "an exportable surplus over the needs of the people". Broad departures from the communistic ideals, adopted as practical measures, are clear indication of the jerky, uncertain progress of the Five-year Plan.

Such signs have certainly tempered American opinion during the past three months, and there is a growing belief that there is no immediate industrial threat in Russian competition. A too-easy-going tolerance has taken the place of panicky fear. The sensible mean between these extremes recognizes that industrially Russia does not appear to be dangerous; but that there is complete incompatability between their politico-social beliefs and ours. Again, time alone can solve the problem; but it is worth remembering that the clash of opposing ideals is as frought with combative possibilities as the competitions of rival producers.

"Nitrogen" vs "Ammonia"

Encouraging is the response of state legislatures to the forward step requiring the use of the term "nitrogen" in place of "ammonia" in connection with the sale of commercial fertilizers. The control laws in thirty-two states now require "nitrogen" and prohibit the use of "ammonia". Both the Middle West and the Southwest have been on a nitrogen basis for some time. As a result of a conference of control officials and fertilizer manufacturers held last May it is confidently expected that the Northeastern states will fall in line on January 1, 1932. This will leave five states, North and South Carolina, Georgia, Florida and Alabama on an "ammonia" basis. Only two of this group, South Carolina and Florida, require "ammonia" analyses by law. The five states still outside the fold are very large consumers of mixed fertilizer and their adoption of the plan is essential to the final success of the movement.

The National Fertilizer Association has led the fight for the more sensible method of computing nitrogenous plant food content, and has recently addressed an open letter to the trade urging further cooperation by both producers and consumers to the end that the entire country may be on a uniform basis.

No sensible reason has been advanced in opposition. It is merely the old problem of overcoming inertia. Where it is felt that some confusion may occur, it is a very simple matter to state in parenthesis the percentage of ammonia until such time as buyers are thoroughly acquainted with the change. Where prices are quoted on a per unit basis, the price of ammonia could also be given in parenthesis. Nitrogen, not ammonia, is the commodity being purchased. It is logical then that analyses should be on a "nitrogen" basis exclusively.

An International Viewpoint

"Chemical Age" (London) reviewing editorially present conditions in Europe states, "No branch of industry is more directly concerned with the European situation—and with the German situation, because just now it is the center of the European situation—than the chemical industry of this country". To a lesser degree this is true also of the American chemical industry. In the summer issue of the I. C. I. Magazine appears a summary and interpretation of the international chemical situation. "If Germany crashes, we all crash." It is well to bear in mind that the author was looking at the question from a chemical viewpoint and was simply stating an inevitable conclusion based on close observation of existing conditions.

Our position in chemical export trade is not unimportant. We stand next to Germany in the list of nations selling chemicals and allied products in foreign markets. Nevertheless we will not permanently increase our export tonnages by one pound by the embarrassment of European countries and the possible attending difficulties of chemical manufacturers in these countries. American quality, American business methods and American ingenuity must be relied on to carry forward our export business. Let us help wherever we can. Nationally we have proved that prosperity is dependent upon individuals and corporations making satisfactory profits. The same line of reasoning is sound internationally.

Quotation Marks

It still remains true that the potential use of nitrogen in agriculture is almost without limit, and that there is immense scope still for its profitable employment. But the agriculturist—usually a slow-moving creature—requires to be educated in the nitrogen habit, and then he must be sufficiently in funds to undertake the purchase. The return on expenditure is sure, but expenditure of any kind in the present condition of agriculture is not popular. So, although the ultimate future of the nitrogen industry may be quite safe, the immediate future is a little troublesome, and we shall have to wait for recovery with patience, infused with confidence.—*The Chemical Age (London).*

We seem to be at a period of great confusion with everyone hustling in out of the rain with very little trading atmosphere present. In the meantime Nature stands prepared to give the world a splendid living almost on any level that mankind cares to conceive just as soon as we settle down to accept what is offered, and secure general education and intelligence enough to become sane consumers and producers.—*Canadian Chemistry and Metallurgy.*

Fifteen Years Ago

(From our issue of September 1916)

Bayer & Co. announces that it will commence action against concerns making acetyl salicylic acid (aspirin).

Congress enacts a tariff for the protection of the coal-tar products industry.

Fifty-third convention of the A. C. S. is held in New York City, Sept. 25 to 30 in conjunction with the second Chemical Exposition.

Marx & Rawolle incorporate a $1,000,000 company.

Marden, Orth & Hastings commence operations in their new Newark, N. J., plant.

Trichlorethylene

By P. S. Carlisle[1] and Thomas Coyle[2]

Solvents are in a period of transition. In no other industrial chemical division are more changes likely to occur in the next few years. Trichlorethylene, one of the newer solvents, is described in detail for the first time in the English language by Messrs. Carlisle and Coyle. The chemical and physical properties of "Tri" offer valuable possibilities to our chemists to add to the many important commercial uses already developed.

SOLVENTS, other than the older petroleum solvents, are coming into more general practice in industry. This wider application is due to several factors chief of which are the following:

1. The demands for a safe solvent, that is, one which is not flammable, nor explosive or capable of forming explosive mixtures with air under all conditions of use.
2. The introduction of the proper closed equipment including recovery systems to utilize economically these newer solvents.

Progress in solvents in this country has been, until comparatively recently, at a leisurely pace. Petroleum solvents were comparatively cheap, no drastic restrictions existed on their use, and ordinary forms of equipment could be utilized. Further, extraction processes of the time did not require any better solvents than the older types. But all this has changed in the last decade, because of the better class of extraction work, which had to be carried out economically.

Before discussing the trend to new solvents, it might be well to review the principles of extraction, to consider why the modern processes and equipment have been evolved to meet a changing condition in industry. Generally speaking, the process of extraction is essentially a diffusion process in which material is transferred from one phase to another. The most common example of extraction is the isolation of fats and oils from native material by extraction with a volatile solvent.

The early extraction processes were devised to remove residual fats and oils from material which had received a preliminary expression treatment to expel the fatty material. The fatty material remaining in the press cake after expression was commonly 10-25 per cent of the initial fatty content. If we consider the expression of flax seed for its linseed oil as an example, a residue of 10-25 per cent of oil in the press cake did not make for an efficient oil recovery. For that reason further treatment of the cake was necessary; usually this was an extraction process.

Solvent extraction for the removal of oils, greases and a number of organic compounds increased in use, to such an extent that in some of the newer methods, the preliminary mechanical or pressing step has been entirely eliminated. The rapidity and completeness of extraction, large yields of highest quality oils, low labor costs, and the large amount of material that can be handled with small installations were responsible for this trend.

In order to handle properly all classes of material, both the percolation and agitation methods of solvent extraction were developed commercially and are commonly used in industry. In the percolation extractors, the solvent is percolated over stationary material; in the agitation method both the material and solvent are kept in constant motion by mechanical methods.

No basic difference exists between apparatus used in plants for extraction of oil and apparatus used in laboratory scale extraction units. The operation consists of extracting the fats with a volatile solvent, and recovering the fats and oils so extracted by distillation. The solvent distilled is recovered.

Extraction processes were used for isolating fats and oils from material which had received no previous treatment, also for the removal of oil from materials

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which could not be subjected to high pressures, or which could be damaged by exposure to high temperatures.

Extraction has been accelerated only because chemical industry has made available at economic price, suitable solvents. Older solvents, characterized chiefly by their ability to "dissolve" would not do, for most often they were chemical mixtures which had no definite boiling range and also left high boiling residues which contaminated the final products. All of which had great bearing on the adoption of the newer solvents, all of which are definite chemical compounds.

Characteristics of Extraction Solvents

All of the properties of a solvent have some bearing on the characteristics which determine its suitability for extraction work. Although for specific extraction processes the choice of solvent is influenced by the nature of the material undergoing extraction, the type of apparatus employed, the initial cost of the solvent and material, and by other factors, adherence to the following characteristics of the "ideal" solvent determines its general value: High solvent power, rapid rate of penetration, ease of separation from extracted matter, economical recovery, high stability, low toxicity and non-inflammability.

These characteristics are determined by certain inherent properties of the solvent, some of which influence more than one factor. The most important properties are: specific gravity, latent heat of vaporization, specific heat of liquid, boiling point, vapor pressures and surface tension.

Examination of the above requirements shows that the older flammable solvents cannot be considered. Europeans have long recognized this and as a result their extraction processes have developed largely along lines of use of the chlorinated hydrocarbons. In Germany and England non-inflammable solvents are used. From their experience, many of our American processes have been developed.

Chlorinated hydrocarbons are chlorine derivatives of methane, ethane and ethylene. Chloroform and carbon tetrachloride, two members of the group, have been known for many years and enjoyed some commercial application, but comparatively high price and improper equipment have kept them from wide utilization until recent times. The most promising member of this group is Trichlorethylene, commonly known as "Tri." This solvent has most of the "ideal" requirements and its properties are such that it meets many exacting conditions of use.

Trichlorethylene was first prepared in 1864 by E. Fischer on treating hexachlorethane with zinc and dilute sulphuric acid. This method of preparation never came into commercial use, and in fact no commercial method was developed until the beginning of the present century. The properties of "Tri" were early determined and its broad applicability predicted.

In 1905 a German patent for the manufacture of "Tri" was taken out. In 1906 a British patent appeared, both of which patented methods were for the preparation of Tri by treating acetylene tetrachloride (Tetrachlorethane) with lime or caustic liquor to split off an HCl group. As soon as commercial manufacture was started, bringing economic prices, "Tri" came into wide use for all types of extraction and cleaning work, and has continued to grow in favor as new uses for it have been developed. In England, "Tri" is marketed under the trade name of Westrosol.

In 1925 the manufacture of "Tri" in America was started by R. & H. The application of "Tri" for commercial processes has been just as rapid here as it was abroad, its adoption being largely influenced by the same characteristics of non-inflammability, high solvent action, stability, non-corrosive action, easy and economical recovery, and mild physiological action.

"Tri" is a clear water-white liquid, with a sweet odor, a density of 1.4762 at 15°/4° C (1 gallon weighs 12.25 lbs.), and a boiling point of 86.7° C (188° F) at 760 mm. pressure. It is a powerful solvent for many types of organic materials and readily mixes with most other solvents although it is practically immiscible with water.

Physical Properties

Formula	$C_2H\,Cl_3$
Molecular Weight	131.4
Color	Water White
Specific Gravity	*Temp.* Sp. G. referred to 0 °C 1.4996 water at 4 °C) 15 °C 1.4762 30 °C 1.4514 45 °CC 1.4262 59.5 °C 1.3997
Pounds per Gallon	12.25
Vapor Density	0.277 pounds per cu. ft. (90 °C) 3.6 cu. ft. per pound (90 °C)
Refractive Index	1.4777 (Sodium light at 19.8 °C) 1.479141 (17 °C)
Viscosity	25 °C 0.5500 Centipoises 50 °C 0.446 (water=0.89 at 25 °C) 75 °C 0.371
Boiling Point	86.7 °C (188 °F)
Freezing Point	−88.0 °C (−126 °F)
Coefficient of expansion	0.001193 at ordinary temp.
Heat of vaporization	58 Cal. per Kg. 104.5 B.t.u. per pound
Specific Heat (liquid)	0.233 (18 °C) Cal/Kg/°C or 0.256 (30 °C)B.t.u./lb./°F
Heat Conductivity (liquid at 64 °F)	0.0672 B.t.u. per sq. ft., per ft. per deg. F. per in.
Dielectric Constant	3.42

Nine and a quarter pounds of "Tri" can be vaporized by the same amount of heat required to evaporate one pound of water. The boiling point changes by 0.042°C. per mm. of mercury pressure change.

Solubility of Water in Tri

Temperature °C	°F	*g. Water Per 100 g. Tri*
10	50	0.017
18	64	0.025
28	82	0.035

The purity, low boiling point, and narrow distillation range (less than 1 Centigrade degree) of commercial Tri permit the ready removal of last traces from extracted matter. The material so extracted, and the material from which extraction is made, can safely be used in the preparation of foodstuffs.

"Tri" is used for extracting edible and inedible oils, removal of caffeine from coffee, for purifying drugs and chemicals, for dry-cleaning raw and finished fabrics, for scouring textiles, for degreasing wool, leather, metals and miscellaneous articles, as a spotting agent, as a base solvent for soaps, as an insecticide and sterilizer, for analytical determinations, and as a raw material for the preparation of other chemicals. "Tri" also serves as the base solvent in many pastes, polishes, cleaning compounds and paints. It also possesses refrigerating properties.

Chemically, "Tri" possesses thermal stability even at temperatures considerably higher than its boiling point. Water in any amount at ordinary or moderately elevated temperatures does not decompose "Tri." At ordinary temperatures, a top layer of water on Tri has a stabilizing effect in that it protects "Tri" from oxidation. "Tri" has no corrosive action of industrial importance on common metals such as iron, steel, copper, tin, lead and aluminum, even when water in any amount is present.

Like other chlorinated hydrocarbons, "Tri" vapors are mildly intoxicating. The hazard of "Tri" to health is considered to be less than that of chloroform and a number of petroleum solvents in common use. All available evidence indicates that "Tri" is non-cumulative in its effect. In using "Tri" or other volatile solvents, provisions should be made for adequate ventilation in and about the process. "Tri" vapors are four and a half times as heavy as air, hence ventilation systems should be of the down-draft type.

Physiological Effects

All gases and vapors other than pure air or water have some physiological action upon the human system. Any operation involving the use of volatile materials should be carried out with a due precautions to health. Equipment should be scientifically designed and built so that the health of operators is not endangered. The solvent should not be permitted to escape into the air. Use of volatile chlorohydrocarbon solvents can be carried out with very little hazard.

Since small leakage or loss may occur even in the best designed plants, relative toxicities of different solvents should be known. These tables are based on reliable data but they all suffer from one drawback—there is no consideration of the human element. This is most important for if any of these volatile solvents are handled carelessly, the health hazard is increased tremendously.

Henderson and Haggard in their book "Noxious Gases," A. C. S. monograph series No. 35, published in 1927, present data on the toxicity of trichlorethylene and other chlorinated hydrocarbons, from which the following table has been taken:

Relative Toxicities, if Carbon Tetrachloride is Arbitrarily Taken as 1.0

Tetrachlormethane (Carbon Tetrachloride)	CCl_4	1.0
Perchlorethylene	C_2Cl_4	1.6
Trichlorethylene	C_2HCl_3	1.7
Dichlorethylene	$C_2H_2Cl_2$	1.7
Trichlormethane (Chloroform)	$CHCl_3$	2.2
Gasoline		2.3
Pentachlorethane	C_2HCl_5	6.2
Tetrachlorethane	$C_2H_2Cl_4$	9.1
Carbon Disulphide	CS_2	24.3 app.

Solvent Power

Due to the selective solvent action of "Tri," it is suitable for separating, extracting or purifying a great many different materials. Wester and Bruins[1] determined the solubilities of many substances in "Tri," from which they developed the following table of relative solubilities:

(1.) Readily soluble in Tri: Fats, resins, waxes and similar materials; (2) well soluble, benzoic acid, free alkaloids, anthracene, cumarin, santonine, sulfur depuratum; (3) slightly soluble, salicylic acid; (4) practically insoluble, ordinary plant acids, glycosides, sugars, alkaloid salts, tannins and theobromines. This classification was determined from the following solubilities:

SOLUBILITY IN TRICHLORETHYLENE AT 15°C
Grams of Substance Dissolved per 100 Grams of Tri

Benzoic Acid	6.9	Colophonium	3 g. dissolve in 5c.c.
Boric Acid	0.016	Cumarin	1.5 g. dissolve in 5c.c.
Citric Acid	0.012	Glucose	0.006
Malic Acid	0.01	Gutta Percha	Resinous part easily soluble
Salicylic Acid	0.28	Heleninum	1.5 g. easily dissolved in 2c.c.
Tartaric Acid	0.005	Codeine Hydrochloride	0.014
Adeps Suillus	in the warm to some degree	Mastic	3g. dissolve in 2c.c.
Agaricinum	0.014	Nicotine	6.5
Aloin	0.013	Potassium Nitrate	0.01
Amygdalinum	0.029	Cocoa Butter	Fair
Anthraceen	1.01	Olive Oil	Fair
Arbutinum	0.011	Piperine	9.83
Aspargin	0.018	Saccharine	0.012
Sodium Biborate	0.011	Saccharine Lactate	0.004
Brucine	2.56	Salicine	0.013
Camphor	10g. dissolve in 5c.c.	Santonine	2.46
Carnuba Wax	Well in warm Tri, not so well in cold	Quinine Sulphate	0.07
Mercuric Chloride	0.035	Sulphur Depuratum	1.16
Codeine	12.0	Tannin	0.012
Caffeine	0.76	Theobromine	0.008

Non-Inflammability

Trichlorethylene is non-inflammable, non-combustible and non-explosive. It may be used to extinguish fires. The National Board of Fire Underwriters classifies trichlorethylene as follows: "The fire hazard is judged to be small, being in a class with that of chloroform." This important feature has favored the use of "Tri" for dry cleaning work, in place of volatile flammable solvents whose vapors form explosive mixtures with air. Such explosive mixtures in dry-cleaning machines are sometimes ignited by small static sparks generated by the contact of metal parts

[1] "Pharaceutisch Weekblad voor Nederland" 51, 1443-6 (1914)

or from textile rubbing. "Tri" is often mixed with flammable volatile solvents to lower their fire hazard.

Tri has wide application as an extraction agent in a number of varied industries. In practically all cases, suitable means have been provided for the recovery of Tri, usually by distillation. About 97 per cent of the caffeine is extracted from the coffee bean by trichlorethylene to produce caffeineless coffee. Nicotine is similarly removed from tobacco. No residue is left on the material after extraction, since last traces are easily removed by distillation. In these extractions the main purpose is to purify the product, but the extracted materials serve as valuable by-products after the solvent is expelled by distillation. Edible oils are isolated from both press cakes and native material. No foreign residue is left in the extracted oil or in the material from which the oil is extracted by the low-boiling trichlorethylene, hence the extracted oils are suitable for use in preparing foodstuffs. Olive oil is one that has been extracted both from native olives and from press cake. Other extractions include the isolation of fats from the cocoa bean, and the extraction of oil from maize.

Extraction of Oils

Linseed oil, cottonseed oil and soy bean oil have been successfully extracted from native seeds and wax has been recovered from the filter press mud of sugar mills. The resulting meal from soy bean is suitable for cattle.

Valuable oils are extracted and recovered from bones, tankage, leathers, garbage. The extraction process in this type of work is growing in favor over the older methods of fat removal, such as rendering or pressing, because of important by-products. Oil and grease are separated from the extracting Tri by distillation. Trinitrotoluol and other aromatic nitro compounds are purified by dissolving the impure compound in "Tri," one part of T. N. T. being soluble in two parts of "Tri." Nitro compounds are then recrystallized.

A chemically clean surface is essential to produce good painting and plating work. Trichlorethylene is used for removing grease from metals. A most efficient unit for surface degreasing—a vapor type of degreasor—has had marked success both in Germany and in this country. Trichlorethylene is boiled and vaporized, the objects to be degreased suspended in the vapor. Vapor immediately condenses on the cold surfaces and runs off carrying away in solution all grease. The suspended objects reach the temperature of the vapor in five seconds to three minutes, depending on the weight or gauge of the metal. By this time the objects are completely degreased and may be removed at once in a dry state. The excess vapor rises in the tank to the level of water-cooled condenser coils along the sides, where it condenses and returns as a liquid to the bottom of the tank. The vapor of "Tri" is approximately 4.5 times as dense as air and has no tendency to overflow from the tank. Only trichlorethylene is vaporized and carried to the surface being cleaned in this unit. All of the oils and greases washed from the objects have a higher boiling point than does Tri, and are thus retained within the liquid.

Degreasing is to be differentiated from extraction in that the primary purpose of degreasing is to produce a properly cleaned surface, while the chief purpose of extraction is to recover the extracted oils. The extracted oils and fats are a by-product in the degreasing process. Dry-cleaning is a very important modification of degreasing.

Raw wool is rapidly degreased, improves the appearance and durability of the goods made from such wool, and prevents fire hazards in the degreasing process. It also assists in imparting good felting qualities to wool.

The extraction of machine oil and dirt from fabrics in textile works is one of the newer applications of Tri. The raw cloth from the looms ordinarily contains 10%-20% by weight of spinning oil and dirt, which formerly was removed by soda and soap. The use of Tri for this work shortens the cleaning time, reduces power and labor costs, produces a better appearing and more durable cloth free from stains and blemishes, and allows the recovery of the spinning oil.

In textile scouring, the use of trichlorethylene in conjunction with scouring soaps enhances the cleaning. Oils, fats, waxes, and tar and paint stains are removed by this scouring. Degumming of silks and silk hosiery is a good example of the effective use of Tri with soaps or sulphonated oils.

Excess natural fat is rapidly removed from hides. This degreasing prevents the leather from becoming stained and uneven during the tanning process, and permits recovery of the excess fat. The extraction of dirt, grease and oil from cotton and wool rags and waste used in engineering shops is accomplished by "Tri."

Printing plates, especially those on which colored inks have been used, are effectively cleaned. Rollers, presses, etc., are also ink-cleaned or degreased by Tri in the printing industry. Trichlorethylene is used for degreasing brake bands and leather belts, where the presence of oil would cause slippage; for degreasing and cleaning motion picture films; and for degreasing such articles as glass, dishes, bakelite and celluloid.

Dry Cleaning

Trichlorethylene is a very suitable solvent for dry-cleaning work, due to its non-inflammable nature, powerful solvent action, stability in the presence of moisture and its harmless effect on tensile strength of all fabrics. Closed equipment with an efficient recovery system should be used for "Tri," but no special construction metals are necessary.

Garments cleaned with trichlorethylene, especially in conjunction with a wet soap receive superior cleaning, better finishing, and improved feel and appearance. No pre-spotting is necessary, and both after-spotting and rewashing are minimized. Garments do not shrink or become damaged. Use of proper wet soap with "Tri" produces the highest quality of cleaning and most pleasing appearance of garments. Suitable soaps can be used safely and effectively since no hydrolysis of the solvent occurs. Preheating or pretumbling of garments to remove moisture has also been found unnecessary. The elimination of these steps lowers handling charges and prevents weakening of those fabrics which lose strength if handled too often or too heavily.

All garments are completely cleaned in the first washing, although a small number of garments may need to be returned to the washer to have traces of after-spotting solvents removed. Garments cleaned with "Tri" can be finished very easily and quickly. Silks and woolens do not become harsh. There is no dimming of the original luster of the garments or change in feel. Colored silks are usually brightened to their natural shades. Fabrics are not damaged nor are they weakened in tensile strength. No change in size after long exposure to "Tri."

Effect of Tri on Tensile Strength

Values in Pounds Per Inch Width
Average of a Number of Experimental Determinations

	Filling		*Warp*	
	Untreated	Treated with Tri	Untreated	Treated with Tri
Cotton	28.8	27.3	37.2	39.2
Linen	33.3	36.8	39.0	46.2
Silk	22.3	21.2	41.5	43.2
Cellulose Acetate Rayon	10.2	10.5	10.8	12.0
Viscose Rayon	19.9	20.1	19.3	20.1
Cuprammonium Rayon	22.1	21.1	33.2	32.5

Insecticide and Fumigant

Trichlorethylene is an insecticide, suitable as a general insecticide provided vapors are confined to an enclosed space. It destroys the grape louse by injection of the solvent into the soil. Harvests of cabbage, beans and potatoes from soil so treated have been found to be greater than harvests from untreated soil. The larvae and pupae of mosquitoes and other stinging and aquatic insects are destroyed by treating water with emulsions and soaps in which "Tri is combined. Such preparations form a protective layer on the water which is not destroyed by aqueous plants.

"Tri" possesses thermodynamic properties suitable as a refrigerant. It can be used with safety, since no explosions are possible with mixtures of air. The refrigerating effect, in changing from liquid at 86°F to vapor at 5°F, is 93.57B.t.u. per lb. The thermodynamic properties at temperatures ordinarily encountered in refrigeration work are:*

			86°F	*5°F*
Absolute pressure	lb/sq. in.	(p)	1.72	0.16
Gage pressure	lb/sq. in	(b. p.)	—12.98	—14.54
Volume-liquid	cu. ft./lb.	v.	...	.0109
Volume-Vapor	cu. ft./lb.	V.	25.2	240.0
Density-liquid	lb./cu. ft.	$\frac{1}{v}$	...	91.6
Density-Vapor	lb./cu. ft.	$\frac{1}{V}$	.0397	.00416
Heat-liquid	B.t.u./lb.	h	20.1	1.17
Heat-Latent	B.t.u./lb.	L	109.5	112.5
Heat-Vapor	B.t.u./lb.	H	129.6	113.67
Entrophy-Liquid	B.t.u./lb. °F		.0368	.00252
Entrophy-Evaporation	"		.0201	.242
Entrophy-Vapor	B.t.u./lb. °F		.2378	.2445

*Table taken from American Society of Refrigeration Engineers Circular No. 9, 1926.

Trichlorethylene is used in preparation of certain organic compounds. A partial list of compounds which have been synthesized includes perchlorethylene, various sulphonic acids, chlorinated derivatives of fats, chloracetic acid, amyl acetate and phynylglycene.

Trichlorethylene has a growing use in laboratories for gravimetric determination of fat content of various foodstuffs and industrial products. Methods have been devised for the analysis of meat, milk, butter, cheese, flour, breadstuffs, chocolate, cocoa, soaps, and various meals and cakes, for rubber investigational work, etc. The extracting solvent is usually recovered in this analytical work.

Trichlorethylene has many other uses based on its high solvent action and on its freedom from fire and toxicity hazards. When used as a base for neutral and liquid soaps, as a spotting agent for dry-cleaning, in paint, tar and oil removers, as a thinner for paints and lacquers, for rubber cements, glues, and various polishes, or in egg covering compounds, "Tri" is not recovered after use as it is in the extraction industries.

Mixtures of Tri With Flammable Solvents

Since "Tri" is readily miscible with many other solvents, mixtures with flammable solvents are often found in commercial use. In preparing such mixtures, precautions in the choice of the diluting solvent are necessary. In general, the reasons for diluting Tri with other solvents are:

(1) Lowering of Volume Cost, solvents for diluting Tri must be of lower cost than "Tri." (2) increasing solvent power, diluent for Tri should be selected so that the resultant mixture is well suited for the material to which the mixture is to be applied. (3) making non-inflammable mixtures, the amount of Tri present in these mixtures should be sufficient to insure a mixture which is: non-inflammable as made up; non-inflammable throughout its evaporation range.

Many of these mixtures are made up to be non-inflammable and are designed for small-scale use as in spotting and cleaning garments in the home. In industrial processes where such mixtures would be recovered the selective vaporization of "Tri" and the flammable constituent would doubtless result in

hazardous condition. Mixtures with inflammable diluents are not recommended for any process where economy of operation demands the recovery of the mixture.

The best diluent is one which has almost exactly the same boiling point. A mixture with such a diluent would evaporate with practically constant composition and it would not change in flammability. Benzol comes close to fulfilling this requirement, but unfortunately is more expensive than other flammables, and it possesses such a low flash point that over 70 per cent "Tri" must be added to it to make a non-inflammable mixture. Moreover it is highly toxic. For these reasons, Benzol is not widely used as a diluent.

Naphtha is much cheaper than benzol and requires only about 50 per cent of "Tri" to make up a non-inflammable mixture. Unfortunately naphtha has a higher initial boiling temperature and a wide distillation range. Consequently, the relatively rapid evaporation of the lower-boiling protective "Tri" leaves such a mixture poorer in "Tri," with an increasing fire hazard. Also, the evaporation rate of this mixture becomes progressively slower until it approaches that of pure naphtha. The flash points of diluents and of the mixtures they form with Tri have been determined in some cases. The following data are representative:

Flash Points of Various Tri Mixtures

Tri	*Flammable Constituent*	*Flash Point*	
0%	100% Varnolene	38°C	100.4°F
30%	70% Varnolene	67°C	152.6°F
50%	50% Varnolene	None	
0%	100% Kerosene	41°C	106°F
50%	50% Kerosene	90°C	194°F
0%	100% Naphtha 72° Grade	21°C	70°F
50%	50% Naphtha	65.5°C	150°F
80%	20% Naphtha	82°C	180°F
0%	100% Benzine	30°C	86°F
50%	50% Benzine	74°C	165°F
75%	25% Benzine	82°C	180°F
83%	17% Benzine	86.5°C	188°F
0%	100% Benzol	27°C	80°F
67%	33% Benzol	86-88°C	187-190°F
0%	100% Turpentine	49°C	120°F
75%	25%		
80%	20% Turpentine	89-90°C	192-195°F
83%	17%		

Flammability of Mixtures

To note the full effects of selective vaporization on the rate of evaporation and change in flammability of binary mixtures containing "Tri," a series of tests were run in the R & H laboratories. Equal volumes of various mixtures were placed in vessels of similar size and shape, and exposed to the same temperatures (20-30°C) and the same air currents. The rates of evaporation, the composition of the residue, and the flash point of the residue were determined at various stages during evaporation. The following data is representative:

Hrs. of Evap.	Tri: Stoddard Solvent 50:50 Mixture: % of Mixt. Evap.	% Tri in Rem.	Flash Point	Tri: Acetone 75:25 Mixture: % of Mixt. Evap.	% Tri in Rem.	Flash Point	Tri: Benzol 60:40 Mixture: % of Mixt. Evap.	% Tri in Rem.	Flash Point
0	0	50.0	None at 95°C	0	74.5	Below 1.5°C	0	59.7	Below 3°C
19	43.2	39.8	"	79.5	99.0	None at 85°C	75.5	69.8	12°C
26	50.0	39.2	"	83.5	100.0	"	81.1	71.0	14°C
42	59.7	34.6	"						
50	69.3	29.0	"						
66	78.5	16.6	54°C						
75	90.3	4.3	49°C						

Hrs. of Evap.	Tri: Stoddard Solvent 50:50 Mixture: % of Mixt. Evap.	% Tri in Rem.	Flash Point	Tri Acetone 75:25 Mixture: % of Mixt. Evap.	% Tri in Rem.	Flash Point	Tri: Benzol 60:40 Mixture: % of Mixt. Evap.	% Tri in Rem.	Flash Point
0				0	75	Below 1.5°C	0	60	Below 3°C
2¼				6.6	....	....	5.3	....	....
6-¾				20.5	83.3	11°C	27.7	60.7	5°C
22¼				41.5	89.0	16°C	37.3	63.2	6°C
31¼				54.2	90.4	27°C	50.0	64.5	7°C
49-¾				68.3	98.5	None at 86C°	67.8	65.8	7°C
94¼							92.1	77.2	18°C

These data show clearly that the "Tri-Stoddard" solvent mixture evaporated at a slow rate, became richer in "Tri," and hence less flammable. At the end of 26 hours only 50 per cent of the "Tri-"Stoddard solvent mixture had evaporated, while 83.5 per cent and 81 per cent, respectively, of the "Tri"-acetone and "Tri"-benzol mixtures was volatilized. On the other hand, the "Tri"-Stoddard solvent mixture did not have a fire hazard after 50 hours of evaporation. At 66 hours, "Tri" content was 16 per cent and the mixture flashed at 54° C. The other two mixtures were flammable until a large amount of the low-boiling constituent had been vaporized.

The rate at which a mixture will evaporate under specific conditions cannot be accurately predicted. Since the temperature, air currents, and exposed surface all affect the drying rate, this rate should be experimentally determined under conditions similar to those at which the mixture is to be used.

The general conclusions to be remembered in regard to mixtures containing "Tri" and a flammable solvent are:

1. The lower the boiling point of the second component, the more rapid is the rate of evaporation of the mixture.

2. In all cases, evaporation becomes progressively slower as it continues.

3. If the second component of the mixture possesses a lower boiling point, the mixture becomes progressively richer in "Tri" during evaporation, with a gradually increasing flash point. Such a mixture has a decreasing fire hazard.

4. If the second component of the mixture boils at a higher temperature, the more rapid volatilization of "Tri" leaves the mixture poorer in "Tri" and with a lower flash point. Such a mixture-although originally free from fire hazard becomes progressively more flammable.

The two most important determinations to be made in a laboratory for mixtures designed to be used as non-inflammable small scale cleaning fluids are: (1) Change in inflammability (flash point) during evaporation; (2) change in drying time (evaporation rate).

Foreign Chemical Trade

In A Depression Year

While both export and import of chemicals have declined considerably in the present business recession our exports during the first six months of 1931 have exceeded our imports by an appreciable amount.

OUR total foreign trade in the second quarter of 1931 dropped to its lowest level in recent years, and the favorable balance during the period was considerably below that of the corresponding period in 1930 but larger for the same period in 1929. The foreign trade in chemicals and allied products also declined for the first six months of 1931 from the 1930 level, which in turn was off from the 1929 figures. Exports amounted to approximately $68,368,000, nearly $3,000,000 greater than imports during Jan-July, 1931. A comparison of export and import figures indicate clearly that the trend is definitely now in the direction of a favorable export balance. Previous to 1927 the pendulum swung almost consistently in the other direction.

Comparison of Chemical Exports and Imports

Year	*Exports*	*Imports*
1928	$187,928,000	$223,774,000
1929	152,108,653	144,062,413
1930	127,985,736	112,127,413
1931 6 months	68,368,000	65,000,000

*Approximate.

This favorable balance is about the only bright side to the present foreign trade in chemicals.

Naval stores and sulfur frequently indicate the trend in the chemical export trade and both these items recorded sharp decreases. Chemical manufactures, industrial specialties, medicinals, pharmaceuticals, and toilet preparations have kept up comparatively well. Imports of practically all crude materials were considerably below last year's figures, with the exception of pyrites, which made a 40 per cent advance. Imports of coal-tar dyes held their own with little change in value and only an 8 per cent loss in quantity.

The following table shows the exports and imports of chemicals and allied products by major groups for the first half of 1930 and 1931:

United States chemical trade during the first half of 1930 and 1931

[In thousands; 000 omitted]

Group	Exports		Imports	
	1930	1931	1930	1931
Total	$93,092	$68,368	$102,067	$65,445
Naval stores, gums, resins	11,638	6,576	13,535	7,609
Drugs, herbs, roots, etc., crude	1,114	802	3,922	2,691
Essential oils	1,035	779	3,421	1,938
Coal-tar products	10,030	5,350	9,361	5,611
Colors, dyes, stains	3,002	2,677	2,797	2,792
Medicinal and pharmaceutical preparations	9,340	7,927	2,863	2,188
Industrial chemical specialties	8,285	7,339	12,634	9,331
Industrial chemicals	12,813	10,616		
Pigments, paints, and varnishes	12,451	8,381	1,546	996
Fertilizers and fertilizer materials	9,432	7,700	35,861	26,421
Soaps and toilet preparations	6,927	5,918	2,494	1,445

—*Commerce Reports*

Naval Stores Prices Down

The considerably lower prices during the current six months compared with the corresponding period of 1930 contributed to the 57 per cent decrease in value of naval stores exported. Quantity shipments of rosin, 442,500 barrels, were 27 per cent less, and of gum spirits of turpentine, 3,712,000 gallons, 33 per

cent less than in the first half of 1930, but shipments of wood turpentine amounting to 433,000 gallons were 7 per cent greater.

There was a marked fall in the invoice value of imports of varnish gums, which dropped 58 per cent, compared with that of the first half of 1930, to $2,490,000, while quantities were off 30 per cent, to 24,329,000 pounds. Imports of other gums and resins, especially receipts of natural camphor, were considerably above those of the corresponding period of 1930, as will be seen in the following table:

United States imports of gums and resins during the first half of 1930 and 1931

[In thousands; 000 omitted]

Item	Quantity		Value	
	1930	1931	1930	1931
	Pounds	*Pounds*		
Varnish gums	34,728	24,329	$5,964	$2,490
Camphor:				
Natural, crude	556	743	221	277
Natural, refined	519	687	293	330
Synthetic	1,170	1,055	414	351
Gum arabic	4,424	5,334	670	411
Gum tragacanth	713	848	307	333
Gum kadaya and talka	2,080	2,523	198	204
Balsams, crude	197	188	109	88
Other gums and resins			364	401

—*Commerce Reports*

Sulphur Exports Reflect Depression

The upward trend in imports of pyrites evident the past few years has continued until receipts of 223,000 tons ($996,000) in the first six months of 1931 were 69 per cent greater than in the first half of last year. More sulfur was shipped to France and Germany in the 1931 six months than in the corresponding period of last year, or 44,300 and 38,000 tons, respectively. All other countries, however, purchased less sulfur and total exports were 176,500 tons ($3,884,000).

There were no unusual changes in the coal-tar products and medicinal groups, with the exception of increases in a few of the medicinal items exported, and the fact that imports of dyes recorded only an 8 per cent decline in quantity of 2,433,000 pounds while the value remained about the same at $2,792,000. Exports of dyes were off one-quarter to 11,818,000 pounds, $2,677,000.

Among the individual classes of industrial chemical exports showing increases were agricultural insecticides and household disinfectants, deodorants, and similar compounds. Calcium chloride, which has been in large demand in the past two or three years because of its new uses, continued to make appreciable increases to a total of 34,885,000 pounds ($405,000).

Figures of exports of some of the so-called "chemical specialties" and some industrial chemicals are available for the first time in the current year and, therefore, are given in quantities and value for the first half of 1931 as follows:

Item	Pounds	Value
Rubber compounding agents	1,154,000	$624,000
Cementing preparations	1,488,000	246,000
Textile specialty compounds (finishes, softeners, bleaches)	2,014,000	163,000
Organic acids, formic, citric, lactic, etc	258,000	50,000
Hydrochloric acid	2,816,000	47,000
Butanol	722,000	86,000
Carbon bisulphide	775,000	52,000
Ethylene compounds	287,000	51,000
Citrate of lime	2,502,000	319,000

—*Commerce Reports*

In the paint group, exports of lacquers continued the progress of the past two or three years with more than double the quantities shipped abroad, or a total exportation of all lacquers for the current six months of 428,500 gallons, valued at $886,800.

Of fertilizers, the trade both ways in ammonium sulfate improved. Imports, which amounted to 3,000 tons ($107,900) in the first six months of 1930, advanced to 33,900 tons ($1,209,000) and exports increased from 49,400 tons ($1,859,000) to 54,500 tons ($1,840,000).

Comparison with Former Years

Comparison of export figures for nineteen important industrial chemicals for the years 1924 and 1925 with 1929 and 1930 shows a rather irregular trend in the growth of our export trade. Several items have

Exports of Important Products

(All Figures for Quantity are Reported in Thousands, the Unit being the Pound Except as Otherwise Specified)

Article	*Quantity (thousands of units specified)*				*Value (thousands of dollars)*					
	1924		*1925*		*1929*		*1930*		*1931-6 Mo.*	
Phosphate rock (tons)	819	$5,121	870	$5,678	1,142	$5,386	1,225	$5,627	475	$2,022
Sulfur (tons)	482	7,894	632	11,154	855	17,628	598	12,525	176	3,884
Ammonium Sulfate (tons)	118	6,919	123	6,749	144	6,295	82	2,909	54	1,840
Rosin (bbls.)[1]	1,452	13,755	1,172	18,889	1,437	20,442	1,266	14,256	442	3,965
Caustic Soda	92,116	2,863	100,955	2,996	121,077	3,516	126,380	3,706	71,132	1,917
Laundry Soap	54,276	3,814	55,806	4,009	47,344	3,193	37,866	2,534	17,494	1,065
Aluminum Sulfate	32,024	408	41,512	506	58,176	607	50,509	573	25,382	260
Carbon Black	36,401	3,509	46,988	3,805	91,829	8,270	84,260	5,789	45,150	2,532
Soda Ash	28,683	683	32,380	775	77,985	1,341	65,873	1,139	32,378	501
Mineral Earth Pigments	28,207	824	31,265	903	41,960	862	45,132	535	5,449	145
Borax	33,742	1,601	33,888	1,528	159,767	2,934	165,862	3,058	76,212	1,587
Dyes	15,713	5,635	25,800	6,694	34,130	7,279	28,063	6,210	11,818	2,697
Dextrin	22,191	900	22,678	1,031	20,828	983	17,114	780	7,226	323
Bleaching Powder	21,602	380	27,389	472	5,023	127	2,949	91	654	29
Calcium Acetate	23,167	733	22,038	685	101	6	22	1	....	...
Acids (except Sulfuric)	12,201	779	15,608	829	20,457	1,122	14,930	970	13,919	324
Dynamite	15,166	2,201	16,986	2,444	16,276	2,228	9,090	1,280	3,300	475
Turpentine (gal.)	11,510	10,105	11,557	11,346	880	435	832	410	433	195
[1]Sulfuric Acid	11,273	180	7,537	152	6,959	141	5,471	14	1,844	310

[1]Barrel of 500 lbs.

declined while others have registered remarkable advances.

In rosin and turpentine the most unfavorable situation is found. Both tonnages and total values indicate quite clearly an important reason for the naval stores industry's chaotic condition. In 1929 and 1930 rosin tonnage held to former years (1931 however will show a big drop) but prices sagged badly in 1930 and are off considerably in 1931. Turpentine is where the situation is acute. Comparison of either tonnage or price reveals a sadly demoralized state of affairs. This condition is not alone due to present temporarily depressed business conditions but to a definite trend away from the use of turpentine abroad and also to a sizable increase in the French naval stores industry. The problem of winning back this market against foreign competitors and against substitute materials is the real problem facing the American naval stores industry.

Exports of caustic soda, aluminum sulfate, carbon black, soda ash, borax, dyes, and mineral earth pigments have made large increases. In six months of 1931 in the midst of bad business conditions we have shipped more than we did in the entire year of 1924 and almost as much as for 1925. The same is true of soda ash. The alkali exports testify to our growth in this direction since the war.

Bleaching powder and calcium acetate figures have declined due more to changing manufacturing conditions than any particular loss of markets to other countries. Several countries formerly importing acetate of lime for the manufacture of acetic acid are now producing this commodity synthetically. The substitution of liquid chlorine for many of the former uses of bleaching powder is of course appreciated by everyone connected with the industry.

The drop in sulfur export tonnage is probably temporary. What will happen in the case of phosphate rock? In the last few years large operations in North Africa (see page 252) have assumed great importance and enjoy a freight rate advantage in all European markets. Aside from the naval stores industry we have made considerable progress in international chemical markets in the past five years. With a return to normal conditions the favorable balance should grow to even greater proportions.

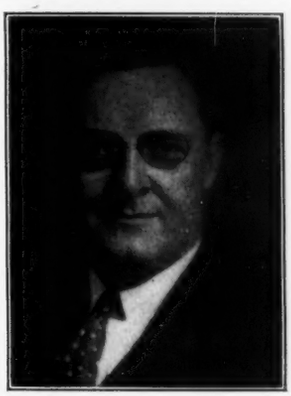
German-British salt cake cartel in effect from 1925 to 1930 is extended to run until the end of 1935. Pending negotiations under way to include French and Belgian salt cake producers, verbal agreements with latter are recognized for allocating current trade.

The 1930 French production of calcium carbide is estimated at 90,000 metric tons, compared with 70,000 tons for 1925. In 1914, 75 per cent of the consumed calcium carbide was used for lighting whereas the remaining 7,000 tons were absorbed in soldering operations. In 1930 the situation was the reverse, soldering consuming from 70,000 to 75,000 tons of calcium carbide, lighting between 9,000 and 10,000 and fixed lighting about 10,000 tons.

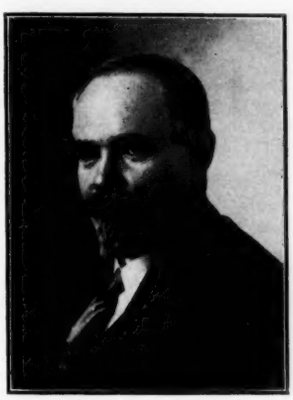
We Congratulate

Theodore Swann - September 5th
John A. Kienle - September 14th
Max Mueller - September 30th

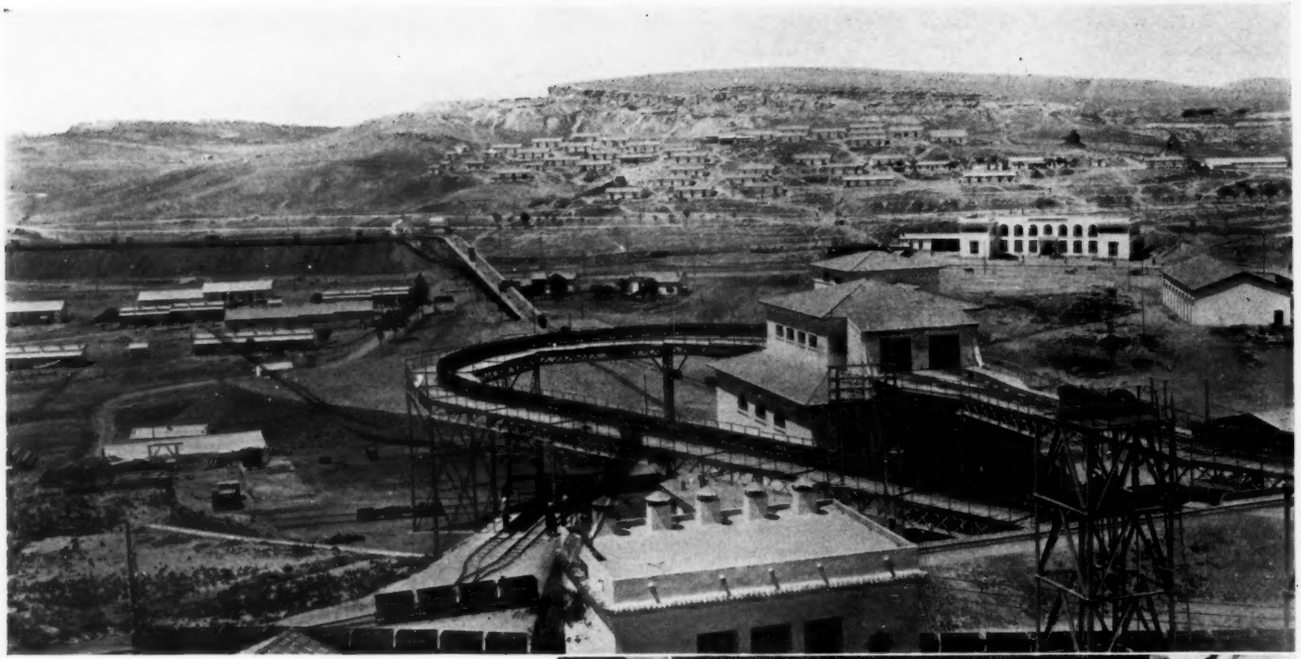
Oliver Optic or Horatio Alger should write Theodore Swann's biography—from farm boy of the Tennessee hills to industrial nabob of the New South; starting as a peddler of electrical wares on to star salesman of motors and dynamos, to electrical contractor on his account, to power plant operator, to electro-chemical industrialist and a high place in the economic councils not alone of his adopted state of Alabama but of the entire Southland. He seems himself to have been electrified; to have become a living dynamo, for speed is his salient characteristic, and he is at once driver and leader. He likes to fly, to shoot quail, to ride horseback. But first and last he is the very real president of the Swann Industries, Inc. For many years may he (as is his custom), work hard and live well.

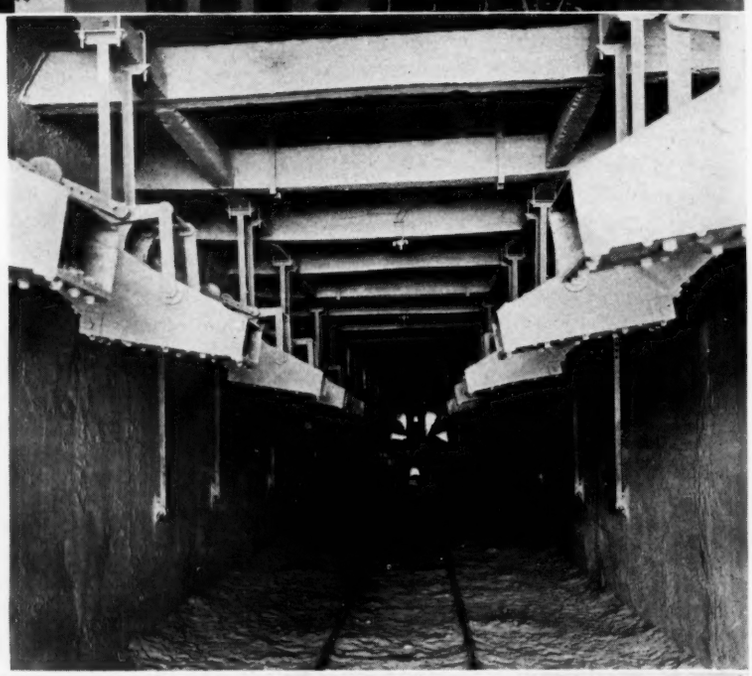


To John A. Kienle our congratulations on three distinct counts. First, because as chief engineer of the Water Commission of Wilmington and later as sales manager of E. B. G., he was a real pioneer in the movement that has given the United States the safest drinking water in the world and saved countless lives. Second because he was picked by E. M. Allen in 1920 to be sales manager of the reorganized Mathieson Alkali Works and has shared manfully in the labors and responsibilities of that corporation's growth. Third, because he is the best "high-low" player in the industry as testified by the fact that his golf scores this summer have ranged between 81 and 111. He lives in Forest Hills, is married, but has no children and accordingly supports two town and four country clubs. To you, Jack Kienle—and how!



A most unusual charm of personality, transparent honesty, a rare simplicity and ease of manner have won for the very modest Dr. Mueller a warm place in the hearts of many friends. Son of a Professor at the University of Geneva; trained as a chemist at Zurich; practiced in his profession at the famous French chemical works of Rhone before he came to this country, he is a chemical engineer of real ability, who has proved hinself an industrialist as well. He is a capital amateur photographer and, getting further from his business, a great lover of gardens and gardening. His home is in Newark, and he has a summer camp in the Adirondacks and a winter bungalow at Nassau. We salute you, Dr. Mueller—a gentleman and a scholar.

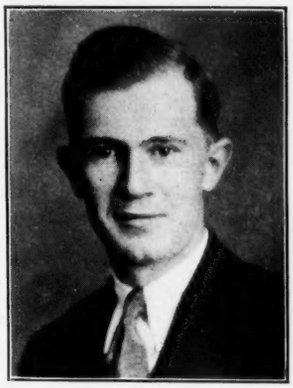




Phosphate Mining in North Africa

Above, plant for the mechanical treatment of phosphate rock in the mine of Djebel Kouif, owned by the Compagnie des Phosphates de Constantine, right, tunnel for the mechanical loading of dried rock and below, stock of finished product awaiting loading. Competition from North African mines, now thoroughly up-to-date, has cut somewhat into our position internationally but export statistics for 1929 and 1930 show large increases when compared with 1924 and 1925. **(See page 250).**

Courtesy, International Superphosphate Mfrs. Association



Insulating Board

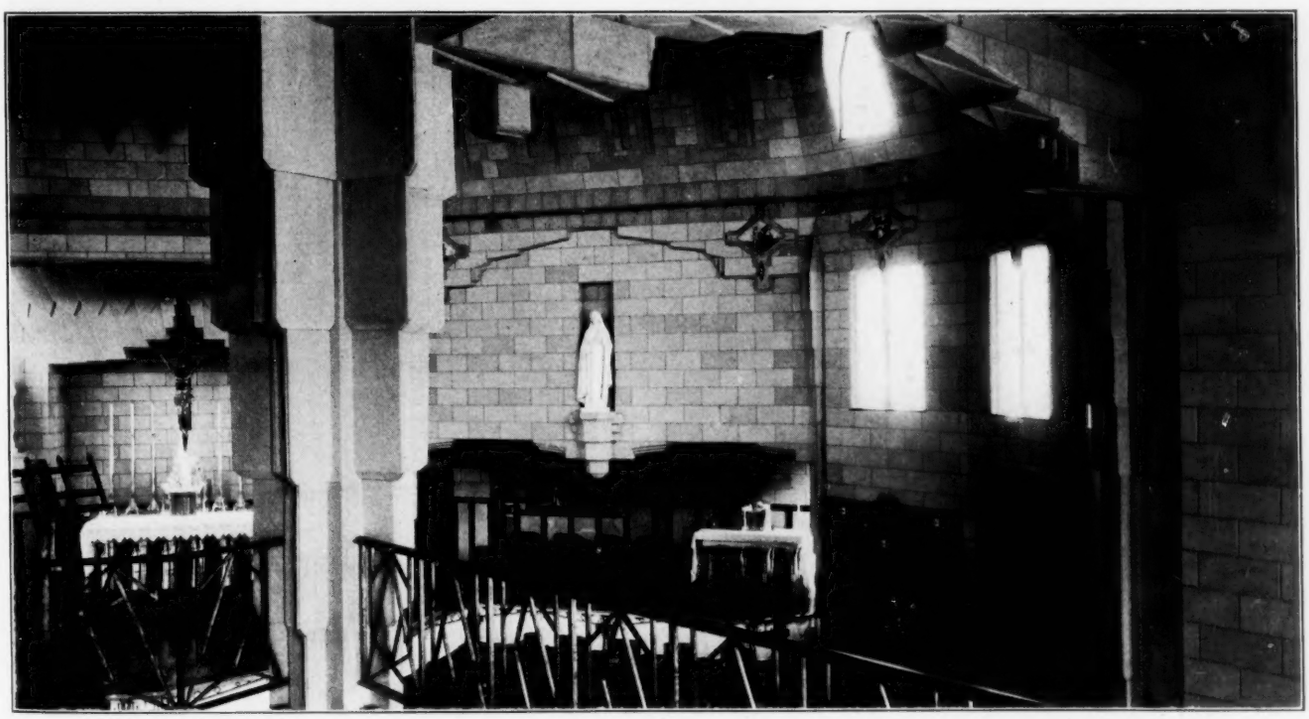
A Growing Chemical Market

By R. G. Quinn*

INSULATION, one of man's first weapons, has long been used unwittingly for protection against extremities of temperature. Early insulation was crude, and little improvement was made until the introduction of cork in Spain in the 16th century. This product has been steadily developed, but due to cost and other considerations, it has not found extensive application for dwelling insulation. Thin sheet and blanket forms of insulation were and are at present used to a limited extent, but they possess no structural value. Insulating building boards, besides being effective barriers to heat, add strength through their use. Partitions of insulating board have, for instance, greater lateral resistance than diagonal pine sheathing and when used as a base for plaster, form a bond of over 1,000 pounds per square foot. Labor savings are effected through its use.

*Research Division, International Paper Co.

The first mill to produce insulating board was started in Canada in 1910. The operations of this mill were limited but the utility of the product was soon established, so that much progress was made before the first project of this kind was undertaken in the United States in 1915. This plant made a board from oversized fibre rejected from an adjacent paper mill. In 1922 the production of board from bagasse, sugar cane fibre, was inaugurated. Along with this development came the first real attempt to sell on a large scale the idea of house insulation to the public, architect and contractor in the United States. From 1926 to date, mills have been put into production using such varied raw materials as wheat straw, extracted licorice roots, cornstalks, cottonwood and willow, southern pine sawmill waste, old newspapers, fir and extracted fibre waste from the rosin industry. There is productive capacity for nearly one billion square



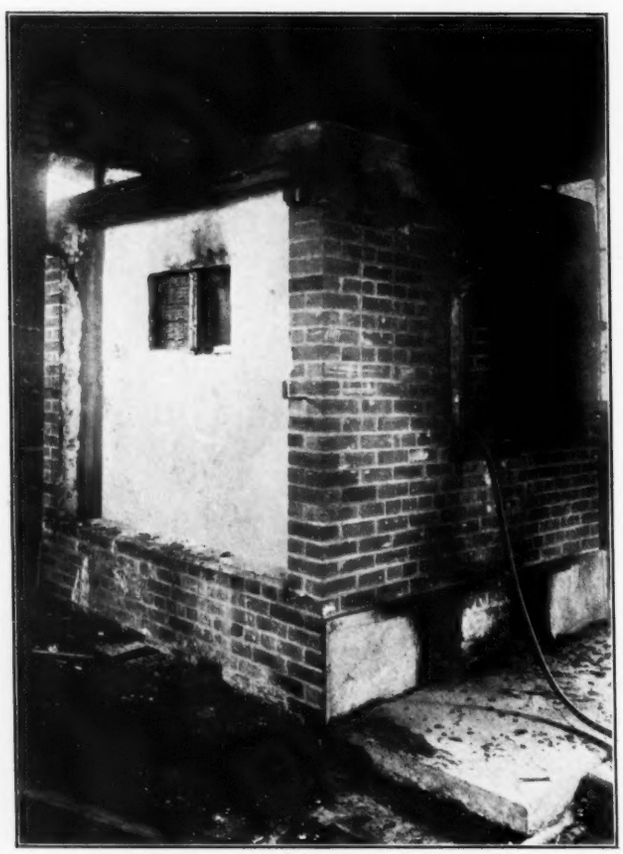
Novel architectural effects obtained while making acoustical correction. Church walls, ceilings and posts o natural unfinished insulating board

feet per annum of ½" board in the United States and Canada alone. These plants, at full capacity, can put 700,000,000 pounds of fibre to good sound economic use. Heretofore the most part of it was discarded waste of no value.

Recently three new mills have gone into production in Sweden and Finland. Additional projects are under way to utilize sugar cane fibre in Hawaii and in the Philippines.

Manufacturing Methods

Just as there is a variety of raw materials, so are the methods of manufacture different. The raw fibrous wastes must first be defiberized either mechanically or through chemical treatment. The first step in the process of pulping waste from annual crops involves a lime or soda treatment. The resultant material is then refined in rod or attrition mills or pulpers in the paper industry. Fibre from spruce and related woods is pulped usually entirely with stone or serrated plate grinders. The degree of refinement obtained in these initial stages is all important. If the fibre is too short, a dense product of comparatively low insulating value will result. Too coarse fibre will yield a soft product of low tensile strength. The usual practice is therefore, to disperse a fine fibre throughout a coarse. The resultant board will be st-ong, light in weight, and have a surface sufficiently smooth for decorating.



Municipal incinerator with plastered Pyro/Test partition intact after exposure to 1525° F. for 75 minutes. Hollow central portions for observation purposes

The pulps, after refinement, are sized. A rosin soap, is mixed with the pulp either in an agitating tank or a beater of the type common in paper production. After thorough dispersion through the pulp mass is secured, an alum solution is added which precipitates a thin film of aluminum resinate on the fibre. This film renders the fibre sufficiently moisture resistant to prevent excessive absorption of water when the product is used as a plaster base and also minimizes the expansion and contraction tendencies of the board.

Waterproofing agents other than rosin size are sometimes applied. Parraffin and asphalt emulsions are occasionally employed for special type boards, and some mills use small percentages of silicate of soda. Sizing agents which do not change the natural color of the fibre are preferable, as a white product is sought.

Method of Formation

The sized pulp is next formed into sheets or mats. Depending upon the machine this operation is intermittent or continuous. Intermittent machines are usually hydraulic presses which mold individual panels four or eight feet wide and from twelve to twenty feet long. Pulp containing 2 to 3% fibre, the remainder water, is made to flow into a box the top and bottom of which are the platens of the press; hydraulic pressure is applied, and the plates force the water out. Expressed water is sucked away through port holes in the plates of the press. The molded panel, as removed from the press on a conveyor, still contains from 40 to 50 per cent water and is ready for a drying operation.

Continuous forming machines, producing a wet mat cut after formation to desired length, are usually cylinders which rotate in a vat of low consistency pulp. The open structured face of the cylinder is covered with a screen mesh which, as the cylinder revolves, picks up fibre. Accompanying water is drained through the screen into the center of the cylinder. Some machines apply suction to speed up water removal while another feeds the pulp under pressure to obtain the same result. To operate at higher linear speeds two cylinders are sometimes operated simultaneously and the resultant wet mats brought together as they enter the press rolls. Another type of continuous unit is a modified Fourdrinier machine. A thin fibrous suspension is laid on an endless moving wire through which the water drains.

Before entering the dryers board formed on a continuous unit is run through a series of press rolls to remove more water. The wet mat from the forming end has from 75 to 80 per cent water. After passing through five or six pairs of press rolls the mat contains about 45 per cent fibre.

One forming machine will produce as much as 250,000 square feet of ½" board per day.

Insulating boards are commonly dried in continuous tunnel multi-deck dryers. Board passes slowly through the different sections under controlled temperature and humidity, and one and a half to three hours are required to produce a product with 2 to 3% moisture. Dryers vary in length from a minimum of 300 feet. Efficiency of this operation must be high as this cost is a major factor in production cost.

After drying the board seasoned during which it is made to pick up its quota of equilibrium moisture. In this way expansion troubles in application are avoided. Boards are next trimmed and cut to desired dimension and then are ready for shipment.

Specialty Boards

Several manufacturers produce different grades of board for special applications. A large field exists for board as an acoustical corrective. Special fabricating methods and designs have been devised which render the product more absorptive of sound waves. At the average frequency of the human voice 512 vibrations per second, ordinary boards retain 30% of the sound striking the surface, 70% being deflected. Specially fabricated products will absorb 60% of the sound. This use of insulating board has not been brought to the attention of the public as has its virtues as a thermal insulator. Many movements towards noise abatement lines will expand markets as we become cognizant of the dollar and cents value of quiet.

While insulating board is most commonly purchased in one-half inch thickness, some producers make homogenous panels up to two inches thick. Others laminate ½″ boards up to the thickness desired. Laminated boards, for instance, are employed in most electric refrigerator cabinet construction. The half inch plies are held together with an animal or dextrin glue or simply stapled.

Insulating board presents interesting possibilities to the manufacturers of chemicals and synthetic resins. Already it consumes some ten million pounds of rosin, four million of soda ash, over a million pounds of caustic soda, and nearly six million pounds of alum.

In addition many tons of special coating materials such as asphalts and resins, are used. Silicate of soda finds application because of its chemical and physical properties for a variety of purposes. Adhesives are consumed in volume particularly in making specialty products. These applications of chemicals are but a starting point when it is considered that eventually all insulating board must be fire-resistant and a percentage termite proof. In tropical countries, insulation is a necessity, but unfortunately these regions for the most part are infested with white ants, termites, whose food is cellulose. Unless board is specially treated it is readily devoured by these pests. Many compounds have been tested as protective agents for lumber and results to date indicate that the same substances are effective when used in insulating boards.

Section of room with walls and ceilings of natural unfinished insulating board

Chlorinated organic compounds, napthalene, arsenious acid, and other arsenic derivatives, zinc, lead, mercury and copper salts are all useful for this purpose. The use of arsenious acid, for instance, to the extent of one per cent in one quarter of the production would mean an outlet for approximately two million pounds of this chemical per annum.

Fireproofed Board

In fireproofing an interesting development has recently been announced in new insulating board which retains all the thermal non-conducting and sound absorbing properties of the wood fibre base, together with non-combustibility. Being of lower density than lumber, and containing a small percentage of metallic salts in their sizing, insulating boards do not burn as fast as wood nor evolve as much heat per unit area. Boards will, however, smoulder persistently, until consumed and for this reason their application is limited by building codes throughout the United States and Canada. This new board, is a chemically treated wood fibre, each fibre of which is waterproofed with a non-combustible waterproofing agent. Fireproofing agents are incorporated in the pulp previous to its formation into wet panels. The process is such that the pores or air cell content of the board is not decreased as the fireproofing salts are forced into the fibre, and not into the instertices. Impregnating processes, such as are applied in the fireproofing of lumber, are not suitable because of resultant decreases in air cell content. The new product has been tested in partitions in comparison with other structural materials. It serves equally as well as mineral wall boards as a barrier to flame with

the additional advantage that the ash will not pulverize when a fire hose is turned on it. Several cities have approved this material for use in structures wherein fibreboards were barred heretofore.

Many chemicals are fireproofing or flameproofing agents, but naturally, due to considerations such as alkalinity or acidity, deliquescence, stability, odor and color, they cannot be used indiscriminately. Cost is a particularly important factor since it must in most cases be added to the manufactured price of the commodity. In some instances it would be necessary to more than triple the price to the consumer in order to pay for this improvement in the product. In other cases the fireproofing of an article will raise its cost to a point higher than that of the same item made of non-inflammable materials. Insulating board is one product which may be fireproofed without excessive increment in cost.

Fireproofing compounds may be divided into two classes: those whose decomposition results in the liberation of non-burning gases so that the oxygen needed for combustion is excluded, and materials which fuse when in contact with flame and form a protecting film. The first type materials owe some of their effectiveness to the considerable heat which is absorbed when they break down. A few chemicals fall into both these classes as they decompose into inert gases and more stable compounds remain which melt and afford additional protection.

When it is known that per thousand insulating board feet from 75 to 125 pounds of commonly used fireproofing agents such as ammonium chloride, sulfate, phosphate, boron compounds, silicate of soda and oxalates, may be effectively used, one may start to figure the enormous possibilities of this field in pounds of chemicals. Furthermore, insulating board is a comparatively new product. Conservative surveys of the potential board market in the United States alone forecast an outlet for nine billion feet per annum.

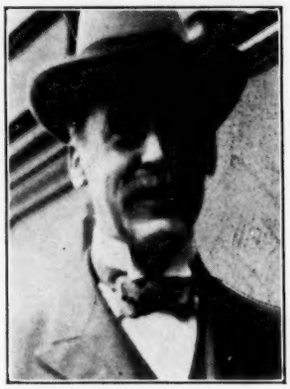
Aside from its use as a thermal insulating and sound proofing agent, fibreboard presents promise as a low cost carrying agent for synthetic resins. It is homogeneous, strong and of uniform fibre formation, so that it may be readily adapted to impregnating processes. Products suitable for base boards, counter and soda fountain tops are possible developments along these lines.

It has many times been predicted that the office and home of the future will be heat, cold, light, sound and humidity controlled. To reach this goal the development of insulation is basically necessary, otherwise the cost of such comfort will be, as it is today, beyond average means. It is a long step to solution of one of man's oldest problems to shelter himself completely from the elements, but the growth of domestic gas and electric heating is illustrative of one stride in that direction. Low cost effective insulation has had its share of responsibility in making this comfort more available.

Foreign News

Very little chemical news of first importance has reached this country in the past few weeks. Interest in England in the recent Plant Exhibition continues and already plans are being laid to hold this event regularly, perhaps once every three years, with the French and German Exhibitions filling in the other two years.

The nitrogen situation remains temporarily quiet. Prices in sulfate of ammonia and cyanamid have been lowered in England but for the moment nitrate prices are held at nominal figures. The "Cosach" has announced lower prices for some foreign ports. In the meantime sporadic efforts are being made to bring together the synthetic producers.



Prof. G. T. Morgan, F. R. S. Pres., Society Chem. Industry

Zinc producers meeting in Paris declared the new cartel effective as of Aug. 1. Members of the cartel have a combined production capacity of 1,123,000 metric tons of zinc a year. This represents 97% of the European and overseas capacity of the world, exclusive of the United States. Stocks of zinc in hands of cartel members June 1 were 229,000, but these were reduced to 206,400 August 1. Production of members in July was 57,300 metric tons, against an average of 76,350 tons a month in 1930 and 69,700 tons in January.

What may be of considerable importance was the action of Germany in passing emergency laws refusing foreign exchange for the financing of importations of manufactured goods. While this is ostensibly done to stabilize the monetary and financial conditions and is strictly a temporary measure our chemical export trade with Germany amounted to about $25,000,000 in 1930. Whether this ruling will be construed to mean articles such as sulfur, turpentine, etc., remains to be seen but it is definitely certain that paints, lacquers, cosmetics, etc., will be affected. How far the ruling effects petroleum products has not been made clear as yet. Those dealing with Germany should give the matter serious study at once.

In England the British Color Users Association at its regular meeting decided to oppose the further renewal of the Dyestuffs Act which runs out at the end of the year. This means a bitter fight for the chemical industry is just as insistent that the Act be continued indefinitely.

German Hydrogenation Progress

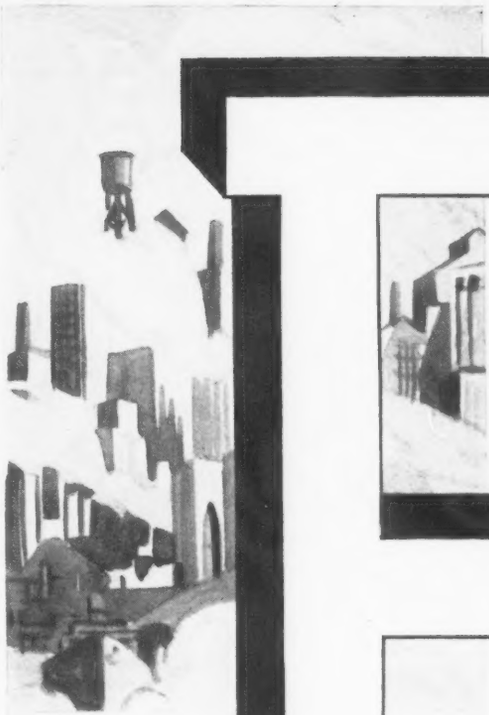
Progress in the perfecting and use of hydrogenation processes is announced by the I. G.

The company officially announces that the gasoline producing capacity of the Leuna plant has been increased from 100,000 to 350,000 tons per annum. This is accomplished through a new catalyzer process and involves no material increase in plant.

The new process represents a shift from hydrogenation of crude lignite, installed in 1926, to the utilization of distilled tar for simultaneous tar hydrogenation and nitrate production from methane.

Since the decline in nitrate consumption the company has concentrated on hydrogenation. The I. G. is stressing the superiority over cracking processes. It is requesting tariff protection to prevent this activity from being adversely affected by price-cutting tactics on the part of gasoline importers.

Nine persons, accused of industrial espionage at the Leuna works have been sentenced to imprisonment by the supreme court at Leipzig. The accused, tried in secret, were convicted of conspiring to obtain details of the I. G. works, patents, formulas and processes and selling the information to the French secret service.



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CHEMICAL

Photographic Record

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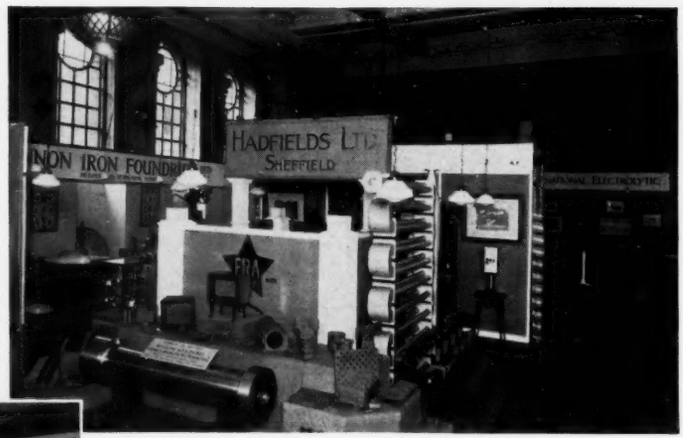
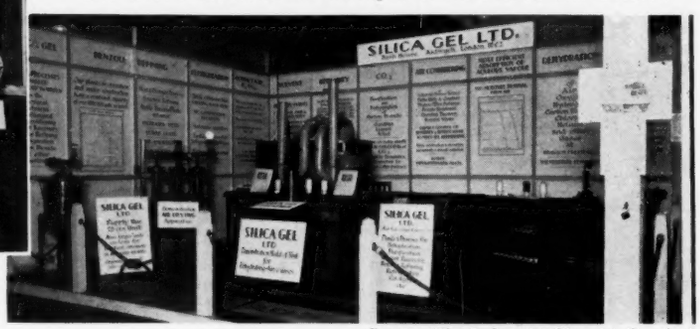
Dr. Linus Pauling, California Institute of Technology, who although only 30 years of age, has already published nearly fifty researches in pure science. He was awarded the Langmuir Prize of the A. C. S., as the outstanding young chemist of the nation at the 82nd meeting in Buffalo, Sept. 2nd

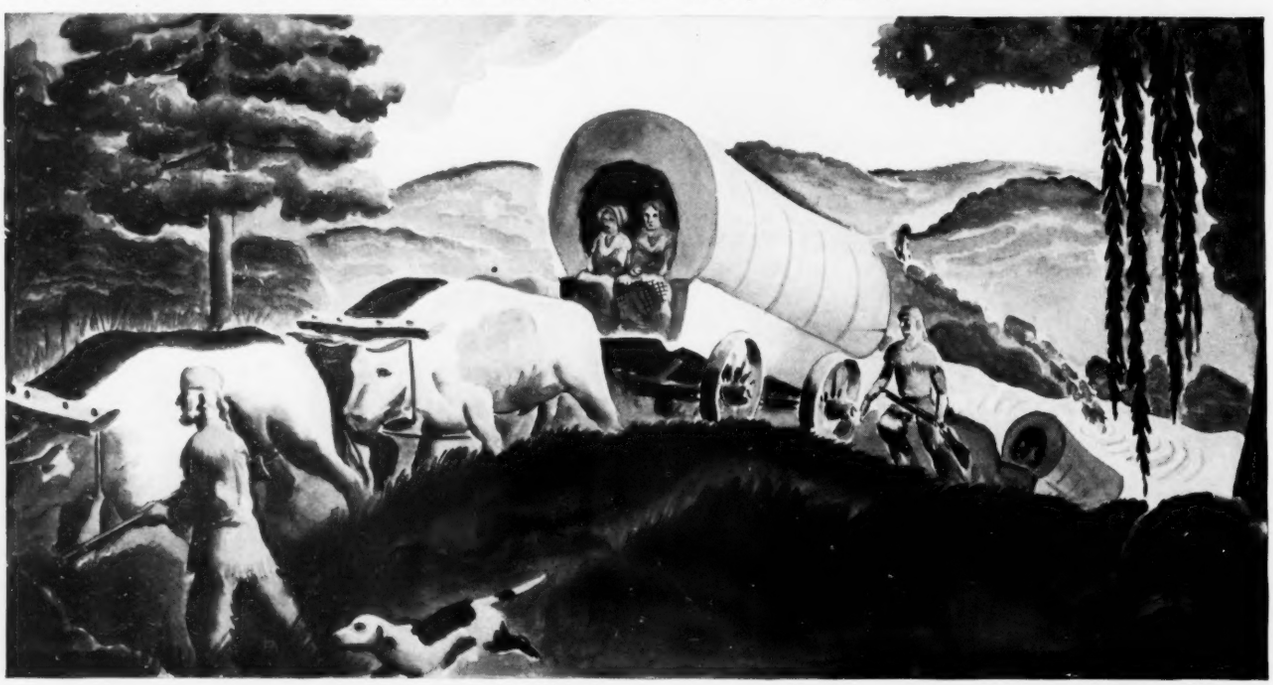


How they do it in England. Views of the recent successful British Chemical Plant Exhibition held in London. Already exhibitors are arranging to give the event a permanent place in the chemical picture with exhibitions alternating with the French and German



Courtesy The Industrial Chemist (London)

An artist's conception of the part played by the Grasselli Chemical Co., in the development of the Middle West. The covered wagon is typical of "then", the pioneer spirit that transformed a wilderness into modern industry so vividly depicted in the companion painting



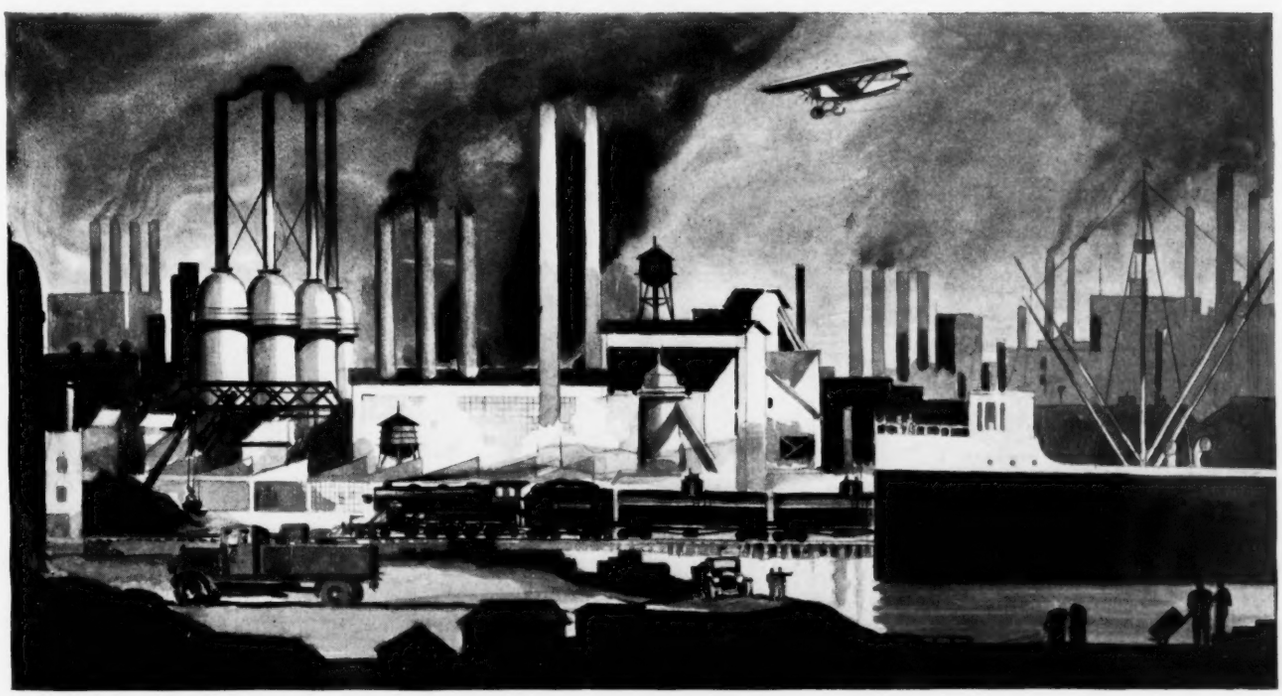
NEWS REEL

of Chemical Activities

Chemical industry is noted for its progressive spirit. The first East to West and West to East flights of the new air freight service carry chemical pay loads. Henry S. Chatfield (right) wishes good luck to a shipment of shellac going to St. Louis, and below, Monsanto Chemical satisfies a customer in the East who forgot to order until it was almost too late. Monsanto barrel in front of the man holding the straw hat

Blank & Stoller

Frank J. Tone, scientist and industrialist, selected as the first winner of the Jacob F. Schoellkopf Gold Medal of the Western New York Section of the American Chemical Society. Tone's production of silicon metal is ranked as a major feat of modern metallurgical chemistry



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Is "Commercial Research" Worth What It Costs?

By F. J. Curtis*

THE prominence and news value of chemical research in the years since the war have caused it to overshadow to some extent other types equally important. Chaplin Tyler has said that "Commercial research is research applied to the business side of industry." Commercial research takes some of the speculative risks out of business and is in its essence a correlation of all the information necessary for the determination of the business value of a given proposition.

From this broader standpoint commercial research brings together data from the chemical research, purchasing, operating, engineering and financial departments and in market study finds its own distinctive specialty. The final result is a report to the executives giving data necessary to making a decision.

Necessarily the order of approach varies with the problem. Let us assume that an idea has been presented for the manufacture of a certain article, the question asked is "Are we interested?" What the commercial research department must do is to make a preliminary cost and market survey. Only a few factors may be necessary to rule out the proposition. On the other hand the investigation may need to be quite detailed if the decision is to be close. The existence of a sufficient supply of raw materials of the right quality in such a location that they can be economically delivered to the plant is a vital necessity. Incident also are the facts as to whether supplies can be obtained from several sources or one. The existence of several sources of supply minimizes the risk of market changes. With the facts in hand with regard to raw materials the next step is to determine the apparent cost of manufacture for which is necessary the cooperation of the research, operating, and engineering staffs.

For conversion cost it is necessary to have figures on labor, power, light, and heat, fuel, steam, supplies and repairs. These estimates may be made from analogous processes, published information, or from facts obtained from consultants. The operating and engineering staffs will be able to estimate capital costs for the plant and the amount of working capital necessary based on the possible production.

It is in figuring overhead that many cost estimates fall down. Overhead varies tremendously from plant to plant and in various locations. Data on taxes, insurance, and interest can be readily obtained from the present manufacturing operation. Depreciation should either openly or implicitly include an obsolescence factor and must be estimated in accordance with the type of manufacture contemplated. Works expenses, which are general costs for laboratories, superintendence, etc. are often prorated on the basis of direct labor. Again, administration and selling expenses vary widely with the type of operation but may be gauged by the present conditions. Many times the use of the process demands a patent or license fee which must be included in cost. The final cost figure enables the calculation of the return on the investment. These calculations depend to a very great degree on the market study because that determines the volume of production on which capital and other factors in cost are figured. For determination of the consumption of the article in question there are government reports particularly the Biennial Census of Manufactures and of Agriculture available. Many of these figures are also published annually. Much information is in the technical press. Again, much informa-

*Director of Development, Merrimac Chemical Co.

tion is available in the general technical and business literature. Publications such as the United States Daily, Journal of Commerce, etc. contain many facts valuable in the files. Consultants here also may have special information which will be of great assistance and private reports and personal contacts must not be underestimated. These sources should give the nature of the market, whether it is seasonal or year-round, whether it is local or national, whether the product is a semi-raw material or ultimate consumer goods. A thorough knowledge of the uses and specifications are an absolute necessity to determine the quantity that can be sold. The quantity that can be sold, however, is not necessarily co-incident with the business that can be obtained. To determine this fraction it is necessary to know the present sources of supply and the degree of saturation of the market, the relation of these present sources to the market and the relation of one's own plant to the same market. The advantages of the home plant may be due to location close to raw materials or market, to utilization of its own raw or intermediate products or by-products to the value of a revolutionary method of manufacture, developed by its own research laboratory or obtained elsewhere. Also should be taken into consideration the selling advantages of an addition to the line which may be handled without additional selling costs. As a result of this study there has been determined how much of a proposed product could be sold by the plant in question under conditions under which it would have a certain tonnage.

If this preliminary study has given a favorable answer, the research laboratory is then asked to take the process in hand to develop technical details. Always in cases of this sort it is wiser when the laboratory work is completed to build a small pilot plant in which problems are bound to arise unknown in the laboratory. On the basis of data obtained in this pilot plant, the engineering and operating departments design large scale apparatus. Due to the discoveries in these last two steps it may be necessary to make vital corrections in the cost calculations and market study. At this point it is quite possible that the situation will no longer look favorable. A final report for the management is made showing whether the company is in a favorable position, how much of the products can be sold and where, the type of selling required and the capital involved, all of which lead up to the determination of the probable return on the investments.

We have followed through one type of commercial research. It should not be taken that this is a hard and fast method. Commercial research necessarily must be as elastic and as able to shape itself to suit particular conditions as any other kind.

The commercial research department also has certain general functions. Its personnel, which is often rolled into one, contains necessarily a chemical economist who should be chemist with economic leanings. Larger departments will include a trained statistician and a librarian or literature specialist. The importance of the collection of technical information sometimes at the moment irrelevant and of an efficient filing system is self-evident. The personnel of a commercial research department should have wide personal contacts, imagination, initiative and a flair for the pleasant extraction of information.

The commercial research department acts as a consultant for executives on specific industrial requirements and conditions. It follows the trend of the chemical industry, the tendencies in the use of present products and the new industries which may be arising. The older products are not neglected but new methods of their manufacture followed closely.

As an illustration of the involved situation sometimes present, we may look for a moment at acetic acid. Formerly made entirely from distillation of wood as one of three joint products, synthetic acetic acid made from carbide has given the wood distillation industry a decided jolt. At the same time chemical research has provided a back-fire in the form of the so-called direct acetic acid processes by which a high strength pure product is made from the impure weak primary pyroligneous acid of the wood distillation. Formerly it was necessary to neutralize this weak acid with lime and evaporate the solution to dryness to form the commercial acetate of lime, which in turn was decomposed with sulfuric acid to recover the strong acetic. The calcium carbide process depends upon acetylene and much work is going on to find other sources of acetylene such as methane. Fermentation is also taking a part both by conversion of sugars and cellulose. Finally the new industry of high-pressure synthesis is producing acetic acid by direct addition of carbon monoxide to methanol. The commercial research department must keep track of these various and quickly developing methods so as to know which is the one to prevail in the future.

Some of the functions of commercial research have been performed since business was first organized. With the inter-industry competition and the interdependence of modern business their importance cannot be over emphasized. It offers the only sure answer to the man who would invest his money wisely.

Annual caustic soda consumption in Japan, 90,000 tons, greatly increases in recent years due to development of viscose industry, which with soap industry consumes more than 60 per cent of total. Remainder is used in paper, textile, dyeing and petroleum industries. The production capacity of caustic soda in Japan is 40,000 tons, of which 24,000 is produced by electrolysis and 8,000 by causticizing soda ash. The consumption, imports and exports of caustic soda for the past four years in Japan were as follows:

	Production tons	*Imports* tons	*Exports* tons
1926	25,886	40,231	47
1927	22,573	45,497	60
1928	30,998	67,915	37
1929	36,956	47,098	25

Harness Supply and Demand

A Definite Plan for the Rehabilitation of Business

By V. V. Kelsey*

ALMOST invariably suggestions to lessen business depressions outline plans for the Government to execute. Yet on every hand we hear—"There is too much Government in business." If there is too much Government in business now, why ask for more? Why not accept a plan, free of all the usual generalities and one that is free from regulation by the Government, thus immediately eliminating politics with all of its shortcomings?

In a recent address to the National Association of Credit Men, James A. Emery, general counsel of National Association of Manufacturers, opened his remarks by saying "We live in a collective, interdependent cooperative society which can neither maintain its existence nor repair disorders without cooperation among its parts. Combination in every form is the natural and effective expression of that conviction." His remarks in this connection are both interesting and significant. The real problem is to find ways and means of controlling combinations and making genuine cooperation mandatory. The public has thought for years the only way to accomplish the control of combinations and demand genuine cooperation was by Government regulation. This procedure as promulgated and made effective has proven to be a failure. Why continue to compound a mistaken policy? The question arises—How then and in what manner can business combinations be controlled and genuine cooperation be made mandatory? Another question immediately arises—How can the law of supply and demand be harnessed and how does it affect business combinations and cooperation? The second of these questions will be discussed briefly with the hope of showing its relationship to the first.

The age-old law of supply and demand is the one that permits us to enjoy prosperous periods and to combat periods of depression, providing this law is utilized. Apparently it has occurred to but a few to inquire whether or not this economic law can be regulated and harnessed so as to be useful to mankind.

A discussion of a few fundamental facts is in order. First, consider cooperation. Certain very definite written rules that must be followed in our daily endeavors. A violation of these rules brings about an immediate penalty. The result is that cooperation of the proper kind is accomplished in practically all cases. Business has no written rules. Business is a game similar in a remarkable degree to the games of golf, baseball, bridge, etc. In all games there are certain very definite rules covering the conduct of these games, the one outstanding exception being the game of business. While business has no written rules certain understandings are differently interpreted at various times, under various conditions. There is no arbiter. Business applies its own interpretation to suit its own condition, which means confusion because of the various interpretations. This is not true of any other game. In all games, with the exception of business, penalties are immediately imposed for any violations.

Such penalties, which are immediately effective, bring about genuine cooperation on the part of the members of each team and precludes excessive violations. The official on the field who has the authority to fix the penalties for the offences is not required to engage in an exchange of correspondence, neither is he required to ask for confirmation of his decision from any outside agency. He complies with the written rules. He is the sole and ultimate arbiter. Contrast these conditions with the game of business, where there are no written rules, where cooperation is a much hoped for desire but which in most instances fails to make itself apparent.

Business should be permitted to organize itself along similar lines, in fact it will be necessary to require business to organize itself along similar lines in order to regulate the law of supply and demand and

*Vice-Pres., and Sales Mgr., Consolidated Feldspar Corp.

to control the periods of prosperity and depression. We must start with certain fundamentals, give consideration to them and to the methods by which they can be utilized. The proper control of business during prosperous periods is as necessary as proper control during periods of depression. The human being is a ready addict to habit. Habit develops into tradition and these two become inherent if permitted to continue sufficiently long. It is difficult to overcome the inertia of habit. Attempts to make constructive changes in our methods of living, in our laws, in our daily habits are difficult, but to do so is to overcome the inertia of habit and tradition. To accomplish this is not impossible. It is only necessary to consider such changes having very definite ends and by following positive programs with a determination refusing to consider the negative, which immediately sets up to oppose the positive. In the solution of any problem, therefore, in harnessing the law of supply and demand, with the idea of decreasing the degree and time of industrial depressions, it becomes necessary to pursue positive and constructive courses, thereby the objections which represent the negative side are overcome.

Successful Industry is Wealth

Everyone should recognize that industry is the foundation of all wealth in this country. We have an exchange called money as a result of this wealth. Money merely represents wealth—it is not in itself wealth. We are dependent upon successful industry for public welfare. For example, agriculture, banking, insurance, public utilities, transportation, science, professions, educational institutions, charitable institutions, the maintenance and development of our municipalities, our States and our Federal Government are all directly dependent upon successful industry. To limit or curb the activities of industry brings about certain unfavorable conditions disastrously affecting the sale and distribution of services and commodities, resulting in depressed conditions. It precludes fair and reasonable competition and is detrimental to public welfare. We hear so much today about unemployment insurance, doles and similar measures, presumably for the purpose of correcting the suffering resulting directly from business depressions. This is a glaring example of attempting to solve a problem by negative means instead of positive means. A negative solution does not correct an unfavorable situation. Only the positive can bring this about. The inequalities in our industrial regulatory laws are glaring examples of negative action versus the positive. Practically all of our would-be regulatory laws are based on the negative. The number of inequalities caused by our industrial laws are appalling. For example, our laws state—if industry fails to earn a profit on its effort and investment it is a violation of the law. Failure to make a return on investment results in bankruptcies and receiverships, which are in direct violation of the law and are caused by a lack of profits. Contrast this with the law—if two or more industries engaged in the same line of endeavor plan to cooperate for their best interests, and for the interests of the public welfare, and for the purpose of earning a reasonable return on investment and efforts, they immediately violate some of our regulatory laws, more specifically the Sherman and Clayton Acts. Apparently no middle ground exists. If industry fails to earn a profit it violates the law. If industry by cooperative action does earn a profit it violates the law.

Result of Too Much Regulation

It is more of a crime to ruin industry by trying to comply with certain regulations than it is to stabilize industry by violating some of the regulatory statutes. The law forbids two men to engage in a fight but it is no violation if two or more industries fight. In the first case the fighting is limited to two individuals, and at most there can be very little harm done and very little suffering results. Picture, the tremendous harm that is done, and the enormous suffering that follows, when two or more industries fight. A combat between two individuals is a fight. A war between two or more industries is healthy competition no matter how destructive.

Two men engaged in combat are frequently asked to settle their difference peaceably and generally do, and walk away together as friends. If two or more industries are engaged in battle involving millions of dollars, and affecting thousands of people, the Government and its laws state that under no circumstances shall they be permitted to settle their differences peaceably and by cooperative action for the benefit of the public. They are required to continue this battle under the caption of "competition." Certainly we need some method of mandatory cooperation.

Numerous laws attempting to regulate business and commerce were enacted at a time when it appeared necessary and were developed without providing methods of making these laws adaptable to changing conditions. Laws intended to be beneficial to commerce and for the protection of the public on the statute books five years or longer are obsolete today. They cannot be applied to business conditions today or tomorrow.

Most of the so-called business regulatory laws were developed through fear that certain conditions might develop resulting in restraint of trade. This is another way of saying they were not predicated upon constructive thoughts. They were developed on negative ideas instead of positive ideas. Fear is always negative. Constructive thinking is positive. The negative method of developing laws by our Congress and general assemblies has become both habitual and traditional. The inertia of habit and tradition must

be overcome to pave the way for constructive legislation, permitting industry to regulate itself, by itself, and for itself for the benefit of the public welfare and thus make useful and usable the law of supply and demand, and thereby largely correct our business depressions. To go a little further, in pointing out some of the inequalities in our present laws the Attorney General recently stated "Over-production, low prices and resulting waste in the field of natural resources such as oil and minerals have given rise to the assertion that combinations to restrict production and thus raise prices are lawful, which under normal conditions would be considered illegal." If it is a good thing to harness the law of supply and demand in times of distress, why is it not wise to follow this same plan in normal times ? The answer to this is obvious.

Agriculture A Privileged Industry

Agriculture has certain legal liberties permitting the utilization of the law of supply and demand by control of over-production. Industry does not have this privilege. The Secretary of Agriculture in his report for 1930 says "The answer to over-production is less production. I want to emphasize the need for equitable, intelligent, systematic and collective action to bring supply into better relationship with demand." " * * * The primary duty of the (Farm) Board is to help farmers organize cooperative marketing associations for the improvement of the distribution of farm products and to aid in preventing the production of surpluses." Why not let industry cooperate ? Why not legalize the methods by which industry will be permitted to cooperate and at the same time make mandatory industrial cooperation ? The method by which industry can be required to cooperate for the public welfare, and the method by which industry can be put on a prosperous basis, and the plan by which the law of supply and demand can be harnessed and made useful for mankind and thereby correct the present depression and preclude further serious depressions, is to have Congress pass a law requiring industry to organize itself into trade associations and to require the industries in each of the various trade associations to regulate that particular line of industry in which they are engaged. Any person, company or corporation engaged in non-competitive industry will not be affected. Two or more persons, companies or corporations engaged in the same line of commerce would be required to form a trade association, or apply any other name that may be desirable, that will then be required to regulate itself, by itself, and for itself. This plan would provide for the association of industry into small units, which would permit these units to adapt themselves quickly to the ever-changing conditions in business. Small units of individual industrial associations would be able to cope successfully and advantageously with the conditions over which they have jurisdiction. Mandatory membership in trade associations and regulation of internal affairs would legalize the ends now sought by such associations. The organization of the Federal Trade Commission was probably intended as a step in this direction. Its usefulness starts and stops at the point of origin for the reason that the Federal Trade Commission has no police powers. Enactment of legislation without means of enforcing legislation is worse than useless; furthermore, a federal bureau organized to regulate all types of business breaks down under its own weight. It is both inefficient and ineffective. A Federal Trade commission, or federal bureau, cannot function however well organized in regulating business as it should be regulated. Such an idea is erroneous and has proven to be so time without end, another glaring example of habit and tradition. Permitting industry to regulate itself, and to organize itself into small units, will immediately wipe out the necessity of our so-called regulatory laws as they now exist with all their inequities. The Sherman Act, Clayton Act, and similar regulatory efforts were predicated upon the premises that they were justified by the results which they were intended to provide and the benefits which were expected to follow their enactment. Under present conditions of business, in its far-reaching ramifications, such laws, in attempting to cover a great deal of ground and to be applicable in the regulation of business, are impractical for obvious reasons. They are not sufficiently adaptable to particular cases to provide the desired results. They are inelastic an non-applicable.

Quoting from a recent business magazine:

"Wool and plumbing institutes fail through lack of support." "The recent passing out of existence of Wool Institute, Inc. (New York) and National Plumbing and Heating Institute, Inc. (Chicago) marks the end of two vastly different types of cooperative effort under somewhat similar conditions."

"While each was well conceived as a constructive force in its special field, both have carried on under great difficulty, both have suffered from prevailing economic conditions, both emphasize in their respective obituary notices that lack of moral support from the industry hastened their demise, both found a Federal agency contributed to their downfall."

"The first serious setback was encountered when early in 1930 the Federal Court enjoined the Institute (Wool) from activities directed to price maintenance, uniform openings, etc."

"In its valedictory bulletin the Institute (Plumbing) cites three major causes for its failure: (1) Lack of willingness to support long term cooperative effort, (2) Failure of the Federal Trade Commission to render assistance, (3) Depression."

If a sufficient number of business men are willing to use their influence in having Congress pass a law requiring the organization of institutes similar to the Wool and Plumbing Institutes, and other similar

trade associations, also making membership obligatory, then there will be no splitting up of the trade associations, or institutes, by its membership. They will be required by law to cooperate to settle their differences by themselves and for themselves.

It is now optional whether an industrial unit becomes a member of a trade association or whether it doesn't. If a certain industry is thus organized there are a number of platitudes set forth which are all right so far as they go, they are Utopian because they cannot be enforced and are useless. The way to correct this is to require the organization of all lines of industry into units. Those engaged in the manufacture of Portland cement would be required to become members of the Portland Cement Manufacturers' Association. Textile mills would be organized on the basis of the product they manufacture. Oil producers, steel producers, chemical manufacturers, lumber concerns, shoe manufacturers, the rubber industry, pottery, tile, glass, etc. would be put in their respective and proper groups. The law would then say to these manufacturers that they alone must control their industry and they will have no outside interference. They will be required to set up their own laws for their own conduct of their affairs. The law requiring the creation and maintenance of trade associations would at the same time provide a few other essential regulations, one of which would be that no member of any trade association would be allowed to sell his product at or below the cost of production. Furthermore, trade associations would be required to provide themselves with a uniform system of accounting and cost accounting. The organic law, making mandatory trade associations would need be scarcely more extensive than herein outlined. It would, however, require the association to handle all disagreements that might arise within the association. Failure of any association member to comply with the rules developed by the trade association would be handled by methods set up within and by the association. The law courts would have nothing whatever to do in this connection. The trade association would elect its own empire, president, director or secretary either from within or without its membership, and this directing head would have full authority and power to act as the final arbiter in all cases of controversy, in a manner prescribed by the association regulations. He would hold office only at the will and discretion of his association membership. These associations would be permitted by law to do the things that they are not now permitted. They would be permitted to curtail production, allot quotas, fix prices if necessary, exchange credit information, refuse to sell except on a cash basis to those who did not conform with the terms of sale of that particular group, regulate production by proper methods so as to conserve our natural resources and for the benefit of the association membership and the public. They would be permitted by law to follow practices for the general benefit of industry which are now prohibited by present regulations. If some member of a trade association had reason to believe that some other member of that association was violating any of the rules set up by the association, the complaining member would immediately notify the association director, and if necessary or advisable would post a certain sum of money as representing good faith in his belief that the other member had violated certain rules. The director would immediately proceed to investigate, and if he found the accused member guilty he would return the money posted by the complainant and would have the power to impose, demand and collect a fine from the offender. The action would be almost immediate and certainly positive. The amount of the fine would be turned over to a central research department set up by the association. The research department would not alone be technical but a department looking to the extension of markets, seeking new uses and outlets, to enlighten consumers.

If this plan were effective today, the Wool and Plumbing Institute, along with numerous other trade bodies, would not cease to exist. They would maintain themselves in a healthy state.

Supply and Demand Protects Consumer

In considering this plan a number of ideas suggest themselves. Among others, you are probably saying the public would be robbed, especially if it were legal for a certain group of manufacturers to fix prices, control production, allot quotas, etc. Keep in mind that the law of supply and demand cannot be changed. It is as inexorable as the law of gravity. It may be that a certain trade association in working out its own salvation for the public welfare would inconvenience a certain number of people for a short period. The damage done and the suffering that may result would be insignificant as compared to the harm done and the suffering caused by the present depression, and other depressions that are bound to occur unless steps are taken to prevent them. What is desired is a method to utilize the law of supply and demand. Trade associations when given the authority to regulate their own business without any interference from the Government utilize the law of supply and demand, which simply means there will be no flood periods, or drought periods.

Suppose the cement industry through its trade organization determined the average cost of producing a barrel of cement to be $4.00. They then decide to fix the selling price at $20.00 per barrel f. o. b. mill. What would result? The cement industry would place itself in the same position it is in today. It would create a depression for itself. Supply would be far in excess of demand. Suppose the cement industry decided to "smoke" the consumers out by holding the price at $20.00 per barrel. This policy would quickly change for the reason foreign made

cement, of good quality prepared to meet all the engineering specifications, could be landed in this country at fair and reasonable prices, and quickly too. Let us assume an exaggerated condition and say that no foreign made cement could possibly be delivered in this country. Nothing very serious would happen. Some few might be inconvenienced for a short period. Substitutes would quickly fill the place of Portland cement, and building would proceed in an orderly fashion, and cement would quickly fall in line. The law of supply and demand regulates for the protection of the public when permitted to do so. As a matter of fact no group of business men would permit an unsatisfactory condition to develop in their industry if given the right and privilege to conduct their own affairs. Business men never rebel when given the right to proceed normally and orderly. They do rebel and should rebel when the laws compel them to become "Industrial Bootleggers."

Present regulations do not protect the people of this country. If they did we would not at this time be in the throes of the worst depression in history. Why not take the necessary steps to correct this condition ? Industry if given the opportunity will quickly point the way.

Consider further our regulatory laws. The Sherman Act was intended to correct an evil which was thought to exist at the time of its enactment and with an idea of precluding a further development of this supposed evil. In the light of subsequent events it has not served its purpose in a practical and satisfactory manner. The only real interpretation that can be applied to the Sherman Act is that no one knows how to interpret it. The courts have variously interpreted it, its meaning is obscure and entirely contingent upon judicial opinions at any given time. Why permit such legislation to continue in effect ?

Again quoting from Mr. Emery's recent address: "In the meantime a great body of supplementary Federal legislation has modified and even repealed the application of the Sherman act to a large volume of particular forms of business, and, in some fields, withdrawn the severer penalties of the original law from selected activities." This prompts us to ask, if the law can be repealed and modified in part, why not in its entirety ?

A Definite Plan of Cooperation

The Capper-Volstead Act permits the cooperation of one competitor with another in producing and distributing his product, providing he is an agriculturist. Farmers, planters, fruit growers are permitted under this act to make agreements for the purpose of better distribution at prices that are intended to earn the producer a reasonable profit on investment and effort. Since agriculture in America is directly dependent upon industry for its prosperity, why permit agriculture by law to regulate itself for its own benefit but at the same time by another series of laws preclude industry from being prosperous ?

We attempt to regulate at the end and not at the beginning. Our plan today seems to be, after the horse is stolen we lock the barn.

How best can our regulatory laws be made to function properly at the point of origin, which would result in eliminating the fallacy of present regulatory laws that are supposed to function, but which do not? The solution seems practical and not at all unreasonable. Life insurance utilizes the law of supply and demand. Regulation precludes destructive price-cutting and practically all unfair trade practices. This is done to protect the people. Healthy competition prevails. We overlook the fact that life insurance companies cannot continue in business in this country unless we have successful industry. Why not let industry regulate itself in like manner. Banking is another example of the utilization of the law of supply and demand. Banking doesn't change the law one iota, it merely uses it. The baseball industry is another example; other cases could be cited.

In attempting to harness the law of supply and demand it should be kept in mind that it is just as much subject to control as the law of gravity, the laws of hydraulics, the laws of chemistry, physics, etc. It can be harnessed for the benefit of mankind. The real problem is to overcome the inertia of habit and tradition.

A plan in principle to conform to the suggestion made here will not preclude a small concern from growing into a very large one, neither will it prevent a large and powerful corporation from becoming weak and ultimately "passing out of the picture." This plan simply means the members of any association will be prohibited from engaging in destructive price cutting, unfair trade practices, the wasting and dissipating of natural resources, overproduction and trade practices that are recognized as being inimical to industry and to the public welfare.

Anyone who desires to enter a competitive business can do so under this plan. He will have the right to go to the directing head of any trade association and secure all the data necessary for his proper guidance in arriving at a decision as to whether or not he then desires to enter that particular field. When he enters any particular industry he will simply be required to comply with the rules and regulations of that industry. He cannot, however, sell at or below the cost of production, and he must upon receiving his charter permitting him to engage in business make immediate application for membership in the trade association governing his particular activity. Under no circumstances will he be refused membership.

This plan, means that the association director will accumulate all the data necessary to properly guide the activities of his association, and these data will be submitted annually, or oftener, if desired, to the Federal Government for its information.

Each trade association will provide its own research bureau, each member contributing a certain percentage of sales for the proper maintenance of the central research department. Free exchange of information will prevail if a member secures a patent, every other member of the association may be allowed to use that patent if they so desire, by paying royalty to the patentee. This whole plan may sound quite radical. It is fundamentally sound and correct, and will result, in utilizing the law of supply and demand and will prevent further serious depressions.

The fact that the law of supply and demand is inexorable does not preclude its being harnessed and thereby made useful and practical for the benefit of mankind. How then can the start be made ?

1. Accept the law of supply and demand as being inexorable.
2. Accept the fact that the law of supply and demand can be utilized for the benefit of all.
3. Accepting the fact that the first two are true, then the business men of this country should start immediately to put these facts into effect.

"Tolerance is different from indifference. Tolerance is a positive thing. It is ability to endure ideas you don't like. Intolerance hates change and new ideas, and the only hope of proper adjustment of a society is that society will have enough tolerance not to throttle efforts at change."

Foreign Notes

England

The National Union of Drug and Chemical Workers of Great Britain has arrived at an agreement with the Drug and Fine Chemical Manufacturers' Association, that will regulate, until further notice, wages and conditions of 20,000 male and female workers. The wages operating under the agreement are:

	Per week s.	d.
Men, grade 1	60	0
grade 2	55	0
grade 3	50	0
Women, grade 1	34	0
grade 2	28	6

The late Lord Melchett's estate has been sworn at a gross value of just over £1,000,000, and duty will be paid on a net value of just under £200,000. These figures do not include land owned by the late Lord Melchett in Palestine, or that part of his collection of pictures, statuary, and other works of art which are exempt from duty as being of national interest and importance. The Palestine property and the late Lord Melchett's famous collection of works of art are stated to be valued at about £250,000. Probate has been granted to the widow, Violet Lady Melchett, his son, the present Lord Melchett, and his son-in-law, Viscount Erleigh, K.C. By his will, dated July 20, 1928, with a codicil of January 24, 1930, the late Lord Melchett left a legacy of £50,000 to his widow and £100,000 to his son Henry, who succeeded to the title. He also left to his son all his State papers and other documents of public and family interest.

Brussels

A new Belgian license tax on nitrate imports and shipments of nitrate in transit is thought to be a measure to force an international agreement, while at the same time aiding domestic producers.

Exporters from the Saar and Germany, exporting through Ghent and Antwerp, are forced to find other channels for their exports.

A new company for the exploitation of arsenic deposits of Tesanj, and also those near Banjaluka in Bosnia, has been formed by the Wood Distillation Co., of Teslic, Jugoslavia, acting in co-operation with the Muselman Trade and Agricultural Bank of Sarajevo. Investigations in the Chemical Analytical Institute of Zagreb have shown that the ore available in very substantial quantities contains about 62 per cent of arsenic and 28 per cent of sulfur.

Soviet Russia

Russian Chemical Development Committee has decided that the production program of the iodine factories in Russia shall be at the rate of 140 tons a year until the end of this year, and at the rate of 340 tons a year for 1932.

The Soviet is going into the manufacture of chemical plant on a large scale under the direction of "Hydromasch" Syndicate. This plant is to be erected in Swerdlowsk, and its first range of manufactures will include containers, cisterns, evaporating apparatus, coolers, heat exchangers, vacuum vessels, drying apparatus, mechanical furnaces, condensers, etc. In connection with the plant, a special iron and copper foundry, with an annual capacity of 30,000 tons, is to be erected. This foundry will concentrate largely on the production of acid-resisting cast iron. The constructional costs of the whole factory are estimated at about two million pounds sterling.

The Industry's Bookshelf

Self-Management in Selling, by David R. Osborne, 267 pages, published by Harper, N. Y. $3.50.

The basic principles of selling and how they may be used in developing management quality in salesmen.

Annual Survey of American Chemistry, Volume V 1930, by Clarence J. West, 627 pages, published by The Chemical Catalog Co., N. Y. $5.00.

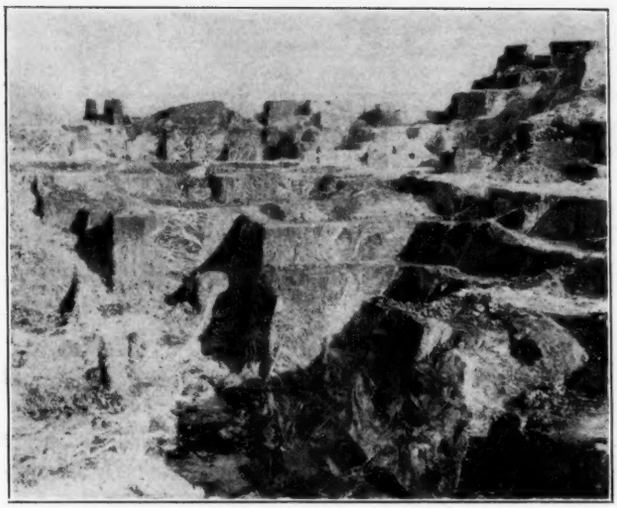
A survey of chemical developments in the country during the past calendar year.

"Vom Wasser." A year-book of the chemistry of water and technique of water purification. Compiled and edited by the Fachgruppe fuer Wasserchemie des Vereins deutscher Chemiker. Vol. IV, 1930. Published by Verlag Chemie, G.m.b. H., Berlin W 10. 200 pages with 10 tables and 20 illustrations. Price RM. 15.—($3.55).

The present year-book brings again a number of interesting articles from the different fields pertaining to water. Aside from two papers on de-acidification of water for drinking purposes, there will be found several articles on the use of ground or surface water, on the treatment of water with chloride, with "Crystalit" a new zeolite-softener, studies on boiler water, a discussion of the effluent problem, etc.

"Addressbuch der Adressbücher." A compilation of trade, professional, city, country and state directories of the world. 20th edition 1930. Published by M. Du Mont Schauberg, Koeln, a Rh., Langgasse 1-3. Clothbound, price RM.3.—(70c).

The fact that eight years after its last edition there was still considerable demand for the directory proves that the present edition fills a long-felt need. The handy little volume contains the addresses of more than 2,000 directories. A detailed subject index greatly facilitates the use of the directory. The book also gives a list of the German diplomatic and consular service in foreign countries, and of foreign consulates in Germany. The directory has been compiled with great thoroughness, and shows a very clear arrangement of the subject matter. For its world-wide scope it should be of value to any business man, especially to those having foreign connections.



A magnesite mine in the heart of India

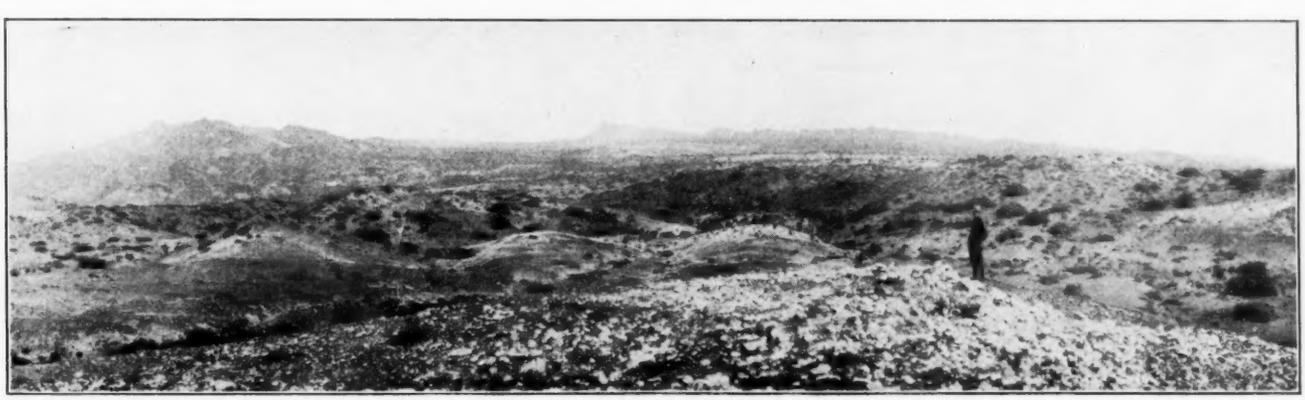
Magnesite

Another Declaration of Chemical Independence

MAGNESITE is a raw chemical commodity of considerable importance to many industries. While primarily used as a refractory material for lining steel furnaces, it does have valuable direct chemical uses, notably epsom salt. In this country however, this method is not as important as in foreign countries. Large quantities of magnesite are used in the production of flooring compositions and other building materials. Other uses are, a substitute for lime in many precipitation processes, in the purification of water (industrial) in the manufacture of magnesia alba, as an absorbent in the manufacture of dynamite, as an adulterant in paint, in making porous cells for electric batteries, for increasing the refractory properties of clay articles, fireclay retorts and furnaces, manufacture of washable drawing and writing paper, in coal briquettes and the manufacture of wall plaster. Formerly, it was a source of supply for the manufacture of carbon dioxide gas, but the utilization of waste CO_2 from other commercial processes have minimized the importance of this use.

Previous to the World War, Austria-Hungary and Greece supplied the major part of the world's requirements. When this supply was summarily shut off India, Russia, and in this country, California, increased operations and with production speeded up in Greece, the industries requiring magnesia managed to obtain a fair amount of tonnage. When hostilities ceased domestic producers and consumers alike thought that material from Austria would be available immediately. Such was not the case for one reason or another. Not until 1921 and 1922 did Austria assume once more its role of leading producer. In the meantime, tariff protection was given to the American industry, and both India and Russia entered into the picture in a much larger way. Today while Austria is first, she has not recovered the tonnage lost in 1914-18.

Domestic production is limited almost entirely to California and to a much less degree, Washington. Previous to the flareup in Europe, more specifically for the five year period, 1910-1914 inclusive, the average output, expressed as crude only slightly exceeded 10,000 tons annually. In 1918, this production was up to the record quantity of 316,838 tons valued at $2,899,818. Sales for refractory purposes dropped off soon after 1918 due to the shortage of freight cars and the cheaper freight cost on dead-burned material, very little of which was then produced in California. Since then domestic producers have gone into the manufacture of the dead-burned on a larger scale and



Magnesite deposits in California. The war forced us into domestic production on a large scale

Year	Crude			Caustic Calcined			Dead-burned		
	Short tons	Value		Short tons	Value		Short tons	Value	
		Total	Average		Total	Average		Total	Average
1922	1,300	$13,330	$10.25	21,990	$ 813,630	$37.00	2,200	$ 51,260	$23.30
1923	6,020	78,260	13.00	28,470	1,035,740	36.38	34,410	671,000	19.50
1924	1,570	20,410	13.00	26,520	883,120	33.30	29,830	787,500	26.40
1925	2,090	26,290	12.58	23,900	782,700	32.75	29,110	923,960	31.74
1926	1,540	17,440	11.32	18,580	596,370	32.10	42,540	1,089,680	25.62
1927	1,800	17,130	9.52	13,890	452,810	32.60	40,210	990,300	24.63
1928	620	5,690	9.18	13,310	454,820	34.17	45,230	1,076,310	23.80
1929	.....	.....	.....	11,390	(2)		78,700	(2)	

1/Prior to 1922, no distinction was made in statistics between caustic and dead-burned magnesite.
2/The Bureau of Mines is not at liberty to publish values for caustic calcined and dead-burned magnesite separately for 1929. The total value of such sales was $1,947,860.

a healthy part of this business has been recovered, as can be seen from the following statistics taken from U. S. Bureau of Mines Information Circular 6437 prepared by Paul M. Tyler.

Magnesite (Expressed as Crude) Sold in the U. S.
(Data from Mineral Resources of the United States)

Year	Short Tons	Value
1911	9,375	$75,000
1912	10,512	84,096
1913	9,632	77,056
1914	11,293	124,223
1915	20,499	274,491
1916	154,974	1,393,693
1917	316,838	2,899,818
1918	231,605	1,812,601
1919	156,226	1,248,415
1920	303,767	2,748,150
1921	47,904	510,177
1922	55,790	571,745
1923	147,250	1,103,700
1924	120,100	1,041,300
1925	120,660	1,432,700
1926	133,500	1,200,830
1927	121,490	1,090,550
1928	127,200	1,098,550
1929	187,657	1,501,256

Another interesting table from the same source shows the marketed production of domestic magnesite by various grades. Production of crude has fluctuated considerably, caustic calcined has declined, while dead-burned figures have increased from year to year. (See table at the top of this page.)

A comparison of domestic sales against imports indicate that in the dead-burned grade, which is the most important one of the three, domestic producers are more than holding their own against foreign material. The annual additions to the supply of magnesite may be considered as domestic sales plus imports, as exports are negligble. Tyler, in his report on magnesite, states that such figures take no account of stocks at grinding mills and in consumers' hands, but they do furnish a fairly accurate index of consumption. (Table below.)

In 1928, the last year for which complete statistics are now available, the standing of the various countries in world production of crude magnesite was as follows: Austria, 310,000 tons; Russia, 120,000; United States, 115,393; Greece, 102,421; Canada, 25,137; British India, 24,798. Much smaller amounts were mined in Australia, Italy, Spain, and Jugoslavia. The total production amounted to 818,474 tons (metric). During 1929 the total Austrian production of crude magnesite, including both crystalline and amorphous was in the neighborhood of 438,000 tons which compares very favorably with the 1913 figure of 422,439 tons for all of Austria-Hungary.

Crude magnesite is natural magnesium carbonate and the two principal forms are amorphous and crystalline. Amorphous is the more common. Dead-burned magnesite is made by calcining crude at high temperatures to drive off nearly all of the carbon dioxide. Caustic calcined is calcined at a much lower temperature in order to hold about three per cent of carbon dioxide in the product. Dead-burned is the grade used by the steel industry for refractory bricks and in loose form. The caustic calcined is the grade used for the manufacture of oxychloride cements and in the chemical industry. One rather important use is as a filler in automobile tires.

Caustic calcined is produced at a temperature of 700-900°C. Another name for this product is lightly calcined. The usual method of production is in a shaft kiln fired by producer gas. This method produces a clean product and is the most economical method.

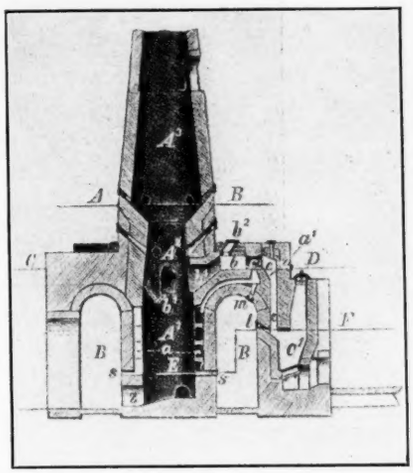
The calcination is described by H. H. Dains, F. I. C., formerly vice-president of the Institute of Chemical

(In Short Tons)

Year	Domestic (Sales)	Crude Imports for Consumption	Total new Supply	Domestic (Sales)	Caustic Calcined Imports for Consumption	Total new Supply	Domestic (Sales)	Dead-burned Imports for Consumption	Total new Supply
Pre-war	(1)	2/15,679	15,679	1/ 5,143	2/ 6,778	11,921	11,921	2/128,444	128,444
1923	6,020	5,182	11,202	28,470	11,229	39,699	34,410	61,726	96,136
1924	1,570	6	1,576	26,520	16,134	42,654	29,830	48,651	78,481
1925	2,090	487	2,577	23,900	17,075	40,975	29,110	51,320	80,430
1926	1,540	608	2,148	18,580	14,758	33,338	42,540	75,535	118,075
1927	1,800	856	2,656	13,890	9,568	23,458	40,210	49,693	89,903
1928	620	762	1,382	13,310	5,474	18,784	45,230	57,007	102,237
1929	...	300	300	11,390	6,500	17,890	78,700	46,382	125,082

1/Average production of crude magnesite, 1909-1913, as reported in published statistics, converted into caustic calcined (for use mainly in paper industry) on basis of 2.0 tons crude to 1.0 ton of caustic.
2/Estimated from general imports (calcined and dead-burned magnesite not segregated) by countries during five-year period ending June 30, 1914.

Technologists in a paper, "Magnesite: Its Preparation and Technical Uses".



Practically all kilns both abroad and in this country are of this type

The magnesite is charged in at the top of the kiln, gradually becomes heated on passing through A3 to the calcining zone A2 and is discharged at the opening Z. The cooling shaft is constructed of hollow iron segments (*a*) through which the secondary air is led to the combustion chamber, so that the heat from the calcined magnesite warms it considerably. Round the cooling shaft runs an arched passage, on the outer side of which are arranged three producers, one of which is shown at C1., while the combustion chambers (*b*) rest on the arches. The passage B gives access to the cooling shaft with its discharging doors Z, to the dampers (*s*) for the secondary air, and also to the backs of the producers.

Gas and air mix together in the culvert *cl* and the flame develops in the six combustion chambers (*b*) passing into the calcining shaft through the six openings (b^1). Stoppages can be easily removed through the rabbling holes (b^2) and the fire can always be watched through these. The process is continuous.

After drawing off, the magnesite is sorted and any unburnt pieces are returned to the kiln. The amount of coal used per ton of caustic magnesia produced is 25 to 30 per cent and the kilns in use in India give an output of 10 tons each per day. After being sorted the caustic magnesia is crushed and finely ground. Millstones are found to answer admirably for the final grinding. The ground magnesia should pass a sieve of 120 mesh with not more than a 4 per cent residue.

Dead-burned magnesia is prepared by temperatures between 1500-1700°C. It may be prepared in shaft kilns with either coal firing or producer gas firing. Analyses usually run between 85-93 per cent magnesia with impurities of silica, iron and aluminum oxides and lime.

One of the chief obstacles confronting the domestic industry has been the fact that magnesite is only found in California and to a much less extent in Washington, while the large market for the material is in the East. This means expensive freight hauls, offset to some degree by tariff. Before 1922 crude or calcined magnesite was admitted duty free. In 1922, the following rates were placed in effect. Crude, five-sixteenths of one cent per pound; caustic calcined, five-eights of one cent per pound; dead-burned, not suitable for oxychloride cements, twenty-three fortieths of one cent per pound. By presidential proclamation, December 9, 1927 the duty on caustic calcined was raised to fifteen-sixteenths of one cent per pound and crude to fifteen-thirty-seconds of one cent per pound. Translated into tons the present rates, unchanged in 1930, are as follows: crude, $93.75; caustic, $16.75; dead-burned, $11.50.

Prices in the last eight or nine years have been fairly stable. As the commodity is relatively cheap and sold in large quantity it is not effected by extreme business conditions as are more expensive products. The price range, 1922-1929 is given as follows:[1]

Year	*Crude*	*Caustic Calcined*	*Dead-burned*
1922.....	$10.25	$37.00	$23.30
1923.....	13.00	36.38	19.50
1924.....	13.00	33.30	26.40
1925.....	12.58	32.75	31.74
1926.....	11.32	32.10	25.62
1927.....	9.52	32.60	24.63
1928.....	9.18	34.17	23.80
1929.....	(2)	35.56	19.60

[1]/Mineral Resources of the United States (Annual). U. S. Geological Survey and U. S. Bureau of Mines.

[2]/None sold.

Despite depressed conditions in industry generally prices in 1930 and 1931 have held very close to former levels. The outlook for the industry is but fair. Dolamite, a high grade magnesium limestone is an active competitor because of its cheapness. In the refractory field magnesite meets competition now not only from dolamite, but from chrome refractories which are about a dollar a square foot cheaper. Natural salts and brine wells are a supply for magnesium products. The flooring and stucco fields, where caustic calcined is used, have felt real competition from Portland cement. However, the production of magnesite in this country is in the hands of only five or six producers so that conditions are fairly stable with production scheduled fairly close to actual consumption.

Association News

Recent association interest centered in the 82nd meeting of the A. C. S., at Buffalo, Aug. 31 to Sept. 4, and the 60th meeting of The Electrochemical Society at Salt Lake City, Sept. 2 to 5 inclusive. Perhaps the most important of the several symposiums held was that dealing with "New Research Tools." On the evening of Sept. 2 Prof. Moses Gomberg presented the annual presidential address and awarded several medals and prizes (rotogravure section). Despite depressed business conditions attendance at both meetings was large reflecting the high regard industry has for the meetings of these two societies.

Dr. L. V. Redman
New A. C. S. President

The A. C. S. meeting was the center for the celebration by hundreds connected with the teaching profession celebrating the tenth anniversary of the founding by the late Dr. Edgar Fahs Smith of the Division of Chemical Education. L. V. Redman as president-elect now assumes the leadership of the A. C. S.

The outstanding event at The Electrochemical Society Meeting was the presentation of the Acheson Medal to Dr. Edwin F. Northrup, vice-president of the AJax Electrothermic Corp. Dr. Northrup's address was on the subject, "What is electricity".

Dr. Charles E. Mullin*

Acetic Acid from Acetylene*

(Part II)

Dr. Howard L. Hunter*

An Abstract Review of the Patents Covering the Manufacture of Acetic Acid from Acetylene by Synthetic Processes

FRENCH Patent No. 479,656, December 23, 1914, to H. Dreyfus, covers the preparation of acetaldehyde by the reaction of acetylene and water, in the presence of a mercury salt, in a liquid medium in which the mercury salt is soluble, such as acetic acid; or in a medium which has a greater solvent power for acetylene than water, such as acetone. In order to oxidize the acetaldehyde to acetic acid, oxidizing substances are added, such as hydrogen peroxide, perborates, percarbonates, permanganates, bichromates, ozone, etc. The oxidation may also be effected by oxygen or air, with or without catalysts such as cerium oxide, vanadium pentoxide, cerium salts, copper acetate, manganates, manganese or copper nitrate, platinum or palladium sponge, etc. An example is given in which 130 parts of acetylene and 80 to 100 parts of oxygen are passed into a mixture of 400 parts of glacial acetic acid, 100 parts of water, 50 parts of mercuric nitrate, and 10 parts of cerium oxide, at 50 to 100° C. The acetic acid is formed continuously and may be drawn off at intervals and distilled, the residue being returned to the reaction vessel.

Addition No. 20,201 to the previous patent, dated March 14, 1917, covers a modification of the principal process in which auxiliary substances, such as infusorial earth, pumice stone, asbestos wadding, etc., are used to increase the reactive surface.

Addition No. 20,202, to the previous patent, also dated March 14, 1917, claims that the oxidation of the acetylene to acetaldehyde, and the oxidation of the latter to acetic acid, may be effected in either one or two phases by controlling the conditions of the reaction, that is, the relative amounts of oxidizing agent introduced. Mercury salts are specified for use as contact substances.

British Patent No. 105,065, March 6, 1917; and United States Patent No. 1,286,255, December 3, 1915, to H. Dreyfus, claim improved yields in the oxidation of acetaldehyde with air or oxygen, in the presence of a catalyst, by maintaining the reaction chamber at a temperature above the boiling point of acetic acid, preferably between 130 and 400° C. The mixture of air or oxygen and acetaldehyde is heated on its way to the reaction chamber, by means of pipes carrying the hot acetic acid vapor from the reaction chamber.

British Patent No. 108,459, April 23, 1917; and United States Patent No. 1,286,256, December 3, 1918, to H. Dreyfus specify a temperature between 150 and 250° C., preferably between 150 and 200° C. as the best for the process described in the preceding patent. Suitable catalysts are platinum, copper and its compounds, chromium compounds, iron, uranium oxide, vanadium oxide, cerium oxide, etc. It is further claimed that catalysts are not necessary for the complete oxidation, although they facilitate the reaction. An excess of air over the theoretical amount is recommended.

British Patent No. 110,545, September 25, 1917, to the same inventor, covers a process for the oxidation of acetaldehyde by air, oxygen, or oxygen-containing gas, at a temperature above the boiling point of the acetaldehyde but below that of acetic acid, preferably in the presence of a catalyst. The necessary mixture of acetaldehyde vapor and air may be obtained by passing air through liquid acetaldehyde, and then passing the mixture into the reaction chamber; or liquid acetaldehyde may be vaporized by a current of air in the reaction chamber itself. The composition of the mixture of vapor and gas may be controlled by regulating the temperature of the liquid acetaldehyde, or of the air; or the liquid acetaldehyde may be diluted with some substance such as acetic acid, to

*Dr. Mullin and Dr. Hunter continue their review of synthetic acetic acid patents, the first part having appeared in the July issue. Dr. Mullin is professor of chemistry, Clemson college, Dr. Hunter is assistant professor.

accomplish the same result. The acetic acid formed is withdrawn and the waste gases containing acetaldehyde are treated again.

British Patent No. 130,035, December 31, 1917; and United States Patent No. 1,308,173, August 1, 1919, to H. Dreyfus, claim the nearly quantitative oxidation of acetaldehyde to acetic acid. Oxygen, air, or any other gas containing free oxygen, is introduced, at nearly atmospheric pressure, into the liquid acetaldehyde, which is maintained at a temperature between 0 and 10° C. by cooling. The solution is vigorously agitated by a rotary stirrer revolving at 500 to 1,000 revolutions per minute, in order to atomize the entering gas in contact with the liquid. Ferric oxide or acetic increase the speed of the reaction. The temperature is not allowed to fall below 0° C., owing to the danger of explosion by the formation of per-acid.

British Patent No. 154,304, September 21, 1919, to the British Cellulose and Chemical Manufacturing Company, M. Soller, and J. Hotz, covers the oxidation of liquid acetaldehyde to acetic acid by the use of china clay as a catalyst. Sodium acetate may also be added, and the oxidation accomplished by passing free oxygen into the agitated mixture, at a temperature of 10 to 20° C.

British Patent No. 154,680, September 19, 1928, to the same inventor, states that the inorganic matter present in animal charcoal forms a satisfactory catalyst for the oxidation of liquid acetaldehyde to acetic acid. The calcium and magnesium phosphates are claimed to be the most effective constituents. The residue obtained by heating animal charcoal in the air, or artificially prepared mixtures of the chief constituents of such residues, can therefore be applied to accelerate the oxidation process, preferably with the addition of sodium acetate.

British Patent No. 156,916, October 17, 1919, to H. Dreyfus claims improved results in the oxidation of acetaldehyde to acetic acid by using as an accelerating catalyst, about 0.25 per cent of ferric oxide. It specifies that the oxide be prepared by precipitation from a ferric salt solution and subsequently calcined at a temperature between 310 and 500° C., the catalytic activity reaching its maximum when the oxide has been heated to above 400° C. It is also stated that this catalyst can be used advantageously in conjunction with sodium acetate, in a proportion not greater than double that of the ferric oxide. The oxidation is carried out in a closed vessel provided with a high velocity stirrer, and when pure oxygen is employed as the oxidizing gas, the vessel must be cooled to keep the temperature down to about 10° C. Pure oxygen is absorbed as fast as it is introduced, but with air, the absorption is slower.

United States Patent No. 1,230,899, June 26, 1917; and Canadian Patent No. 178,237, July 17, 1919, to H. Hibbert, assignor to the Union Carbide Company, cover the production of acetic acid by the action of oxygen on acetaldehyde in the presence of wood charcoal previously saturated with strong acetic acid.

Swedish Patent No. 28,501, April 8, 1918, to S. Utheim, covers the oxidation of acetaldehyde by oxygen without the use of a catalyst. The reaction is carried on in the presence of a solvent for the acetaldehyde and at a temperature above its boiling point at the pressure used.

British Patent No. 116,279, May 13, 1918, to S. Utheim, specifies the introduction of acetaldehyde and oxygen separately and continuously, in controlled small quantities, into reaction chambers consisting of narrow silver or aluminum tubes. The acetaldehyde is kept in the vapor state in the reaction chamber at a temperature between 30 and 70° C., under a pressure of 3 to 15 atmospheres. The acetic acid is withdrawn continuously as produced.

Danish Patent No. 23,175, June 24, 1918, to the same inventor, provides for the hydrolysis of acetylene in the presence of mercury compounds and oxidizing agents, with the addition of non-oxidizing compounds of one or more of the metals of the iron group.

Norwegian Patent No. 29,011, August 12, 1918, covers the oxidation of acetaldehyde by a suitable gas under pressure. It specifies that the reacting substances be introduced separately into a restricted reaction chamber in limited quantities, so that the oxidizing gases can act only on small quantities of the acetaldehyde at one time.

Canadian Electro-Products Company Patents

British Patent No. 132,558, June 18, 1918; and United States Patent No. 1,676,454, August 10, 1928, to H. W. Matheson, cover the preparation of acetic acid by the oxidation of acetaldehyde in a closed vessel with a suitable resistant lining, preferably of aluminum, and provided with a series of coils, through which water or steam may be passed. An air pipe is provided extending to the bottom of the vessel, where it is arranged in spiral form with a multitude of small openings, so that the air is finely distributed over the whole area of the vessel. The vessel is charged with 1,000 gallons of acetaldehyde and about 0.5 per cent of manganese acetate or other catalyst. Steam or warm water is passed through the coils to raise the temperature to 20 to 25° C., and air is admitted at a rate of up to 300 cubic feet per minute. The oxidation is exothermic and the temperature is controlled by passing cold water through the coils. The temperature is maintained just below the boiling point of the aldehyde at the pressure used. After the reaction starts the pressure is allowed to rise slowly to about 75 pounds per square inch, and the temperature to 65° C. Under these conditions the absorption of the oxygen is complete and the nitrogen is allowed to escape through a relief valve after passing through a cold-water condenser at 1 to 5° C., and a brine condenser

at 10 to 15° C., which are under the same pressure as the reaction vessel. The condensed liquid returns to the reaction vessel through U seals. The escaping nitrogen is passed through a scrubber supplied with water at 0° C., and maintained at a pressure of 20 pounds per square inch. The reaction is complete in 8 to 18 hours, after which the contents of the vessel are discharged and the acetic acid is purified by distillation.

United States Patent No. 1,410,207, March 21, 1922; and United States re-issue No. 17,377, July 16, 1929, of the same patent to H. W. Matheson, claim a modification of the previously described patent by the use of a pressure of 120 pounds per square inch for the reaction pressure.

British Patent No. 154,368, September 9, 1919; and United States Patent No. 1,481,326, January 22, 1924, to H. W. Matheson, assignor to the Canadian Electro-Products Company, cover a new type of reaction apparatus for the conversion of acetaldehyde into acetic acid. The acetaldehyde is treated with air in the presence of a catalyst, in an aluminum lined vessel. This vessel contains two water-cooled metal coils for the regulation of the temperature and is fitted with two condensers, one water-cooled and the other brine-cooled, in series. The condensed product from each condenser is returned to the reaction vessel, by means of an outlet pipe below the level of the liquid.

Canadian Patent No. 217,624, April 11, 1922, to H. W. Matheson, covers the preparation of acetic acid by passing air into acetaldehyde containing a catalyst under 20 to 120 pounds per square inch pressure, at temperatures from 25 to 70° C. It specifies that the temperature should be kept below the boiling point of the aldehyde at the pressure used.

Canadian Patent No. 217,626, April 11, 1922, to H. W. Matheson covers the construction of an apparatus for the manufacture of acetic acid from acetaldehyde. The reaction vessel is connected with a reflux condenser and is provided with a pressure-regulating device and a double coil, through which heating and cooling agents may be circulated. An air pipe leading into the vessel has a spiral portion at the bottom with perforations opening downward, through which streams of air are circulated to keep the bottom of the vessel free from sediment.

Patents of the Societe des Acieries et Forges de Firminy

British Patent No. 124,194, February 18, 1919, to the Societe des Acieries et Forges de Firminy, covers the manufacturer of acetaldehyde by passing acetylene through a catalyzing liquid consisting of aqueous sulfuric acid, mercury salts, and small quantities of ferric salts and vanadium compounds. The liquid, which gives no sludge during use, is regenerated by electrolytic oxidation. The aldehyde vapor, carried along by the excess of acetylene, is polymerized by treatment with a 15 to 20 per cent solution of sulfuric acid. The paraldehyde is separated and depolymerized by boiling with dilute sulfuric acid. The acetaldehyde vapors are oxidized to acetic acid by treatment with air or oxygen in the presence of a catalyst consisting of copper permanganate or a mixture of copper and manganese salts. It is claimed that oxonized oxygen, such as that evolved at the anode in reducing aldehyde to alcohol by electrolysis, may be used. A suitable apparatus is specified.

British Patent No. 124,195, February 18, 1919, to the same concern, covers the direct conversion of paraldehyde into acetic acid, by electrolytic oxidation. This reaction is conducted in a cell provided with a porous cathode, such as gas, carbon and a refractory anode, such as magentite or platinum, using a high current density and a 10 per cent solution of sulfuric acid as the electrolyte. The paraldehyde is poured upon the surface of the acid, and dissolves until a concentration of 10 to 15 per cent is reached. The excess floats on the surface and dissolves as the oxidation proceeds. Oxidation is facilitated by the addition of a small quantity of a salt of a metal capable of several degrees of oxidation, such as manganese, cerium, molybdenum, or vanadium. The concentration of the acetic acid may reach 40 per cent, and it is then separated from the sulfuric acid by distillation.

British Patent No. 132,529, February 18, 1919, to the same inventors, covers the conversion of the acetaldehyde formed according to the process described in British Patent No. 124,194. The vapors of acetaldehyde, produced by the catalytic hydration of acetylene, are absorbed from the gaseous current by means of a 15 to 20 per cent solution of sulfuric acid at 20 C., which polymerizes the aldehyde to paraldehyde. The latter is separated from the acid, depolymerized by boiling with a 30 to 50 per cent sulfuric acid solution, and converted into acetic acid by the action of air or oxygen, in the presence of copper permanganate or a mixture of copper and manganese acetates. The object of the temporary polymerization of the aldehyde is to secure a better recovery of the product from the reaction gases by conversion into the less volatile and more easily handled paraldehyde. This enables the material to be temporarily stored without risk in the event of a breakdown of the oxidizing plant. The hydration, polymerization, depolymerization, and oxidation reactions are conveniently carried out in a series of five sandstone towers, through which the gas passes counter-current to the liquid reagents. The first tower is used only for removing the excess aldehyde from the spent hydrating catalyst previous to its electrolytic regeneration, and each of the remaining towers serves for one of the four previously mentioned reactions.

United States Patent No. 1,601,891, October 5, 1926, to E. G. Thorin, assignor to Stockholms Superfosfat Fabriks Akt., covers the oxidation of acetaldehyde in an upright tube filled with small pieces of solid material. The upper part of the tube is provided with a cooling jacket to condense the acetic acid and acetaldehyde, and the lower part with a heating jacket to remove the acetaldehyde from the acetic acid. An acetic acid solution of the catalyst is admitted to the top of the tube, and between the two jackets, there is an inlet for liquid acetaldehyde. At the bottom of the tube is an inlet for the gas containing oxygen and an outlet for the acetic acid formed. Waste gases are withdrawn at the top.

Swedish Patent No. 62,474, March 1, 1927; and German Patent No. 488,986, April 13, 1927, to the same company, cover the oxidation of acetaldehyde by oxygen or air with or without the aid of a catalyst. The reaction components are brought together in stills filled with solid diluents in order to avoid explosions.

The Imperial Chemical Industries Patents

British Patent No. 304,350, October 18, 1927, to the Imperial Chemical Industries, Ltd., S. W. Rowell, and H. S. Hirst; and French Patent No. 662,384, October 16, 1928, to The Imperial Chemical Industries, Ltd., cover a continuous process for the air oxidation of acetaldehyde in the presence of a catalyst, such as manganese acetate and a trace of cobalt acetate. An apparatus is described in which acetic acid containing the dissolved catalyst flows down a tower, meeting a counter-current of air and acetaldehyde vapor. Acetic acid is withdrawn at the base of the tower and separated, by freezing or distillation, into pure acid and catalyst acid, the latter being returned to the tower. The temperature is regulated by withdrawing liquor from a plate near the middle of the tower, cooling it, and returning it a little higher up in the tower. The amount of liquor circulated per hour in this way is preferably about ten times the amount of catalyst acid fed to the tower.

British Patent No. 308,937, July 18, 1928, to H. D. Golding, F. D. Leicester, H. S. Hirst, S. W. Rowell, and Imperial Chemical Industries, Ltd., covers the oxidation of acetaldehyde to acetic acid, in the liquid phase. Air or oxygen is used as the oxidizing agent, in the presence of a catalyst consisting of a small quantity of a cobalt compound, such as cobalt acetate. Manganese acetate is claimed to be a good catalyst after the reaction has started, but a small amount of the cobalt salt is necessary to start the reaction. A temperature of 30 to 40° C. (86 to 104° F.), is suitable with 0.005 per cent of cobalt acetate. Larger amounts of catalyst may cause undesirable oxidation with the formation of carbon dioxide.

British Patent No. 319,433, August 7, 1928, to S. W. Rowell and Imperial Chemical Industries, Ltd., covers the oxidation of a 10 to 25 per cent solution of acetaldehyde in acetic acid, by air or oxygen in a very finely-divided form. The gas is secured in this form by forcing it through a porous plate at the bottom of a tower into which the solution is fed. Cooling or heating coils may be used, and the exit gases may be scrubbed with acetic acid.

Miscellaneous Patents

German Patent No. 301,274, June 5, 1914, to the Verein fur Chemische Industrie, covers the dilution of the acetaldehyde with an inert diluent, such as tetrachloroethane, before oxidation, in order to reduce the volatility of the aldehyde. The oxidation is carried out at 70 to 90° C., using air or oxygen at 1 to 2 atmospheres pressure, either with or without a catalyst, the acetic acid being finally separated by fractional distillation.

United States Patent No. 1,179,420, April 18, 1916, to E. Galitzenstein and M. Mugdan covers the production of acetic acid by the oxidation of acetaldehyde with oxygen, using manganese acetate or other manganese compound as a catalyst, and cooling to absorb the heat evolved.

British Patent No. 130,651, February 28, 1918; and United States Patent No. 1,409,098, March 7, 1922, to A. Guyot, assignor to Comptoir des Produits Chimiques d'Alais et de la Camargue, cover the oxidation of acetaldehyde in a tower or series of towers, containing quartz, broken glass, or other inert material, by means of oxygen or air without a catalyst. The reaction products flow into a supplementary heating apparatus, maintained at 100° C., where any per-acetic acid not decomposed in the oxidation towers is immediately converted into acetic acid, thereby averting the danger of explosion resulting from tis accumulation in the oxidation apparatus.

British Patent No. 154,579, November 4, 1920, to A. Wohl, specifies that in the catalytic hydration of acetaldehyde, mercury salts may be replaced by non-volatile salts of the heavy metals, whih are not appreciably transformed into oxides at temperatures below red heat. The chemicals suggested are basic zinc vanadate, the basic molybdates, or chromates of zinc. Copper, cobalt, nickel, or cadmium may also be used, but with inferior results. The acetylene is mixed with a considerable excess of air and steam, and at about 260° C. under favorable conditions, 75 to 80 per cent of the theoretical yield of acetaldehyde, together with five per cent of acetic acid, is obtained.

British Patent No. 156,146, December 31, 1920, to H. O. Traun's Forschungslaboratorium, covers the oxidation of acetaldehyde to acetic acid by means of air or oxygen in the presence of catalysts. In order to avoid the formation of peracetic acid, the use of a highly hydrated salt as the catalyst, such as ferrous sulfate, or nickel, cobalt, manganese, chromium, or copper salts, particularly their hydrated acetates, is

suggested. The water of crystallization present also aids the reaction without diluting the reaction mixture with water, as is now commonly done. As this dilution is avoided, an almost anhydrous acid is obtained which contains so little of the peracetic acid that it can be distilled without risk of explosion.

British Patent No. 156,147, December 31, 1920, to the same inventor as the previous patent, covers a continuous process for producing acetaldehyde from acetylene. The acetylene is passed, preferably by means of a vacuum, through a porous conductive anode containing mercury compounds, which are continuously regenerated by the application of a current of 1.5 to 2 volts. The electrolyte is preferably a 25 per cent solution of phosphoric acid at a temperature of 40 to 60° C. The acetaldehyde distills off as it is formed, and it is claimed that, except for the addition of the requisite quantities of water, the cells work regularly for months without attention. Acetic acid may also be obtained continuously in one operation from acetylene in the same cell, using a current of 3 to 4 volts, so that the acetaldehyde first formed undergoes anodic oxidation. In order to distill off the acid as it is formed, phosphoric acid of boiling point above 130° C. must be used as the electrolyte, and the cell is worked under a vacuum at a temperature of 80 to 90° C. It is claimed that the yield of acetic acid is 75 to 86 per cent, together with 10 to 20 per cent of acetaldehyde.

British Patent No. 156,152, December 31, 1920, to the same inventor, covers a process for the hydration of acetylene to acetaldehyde in a continuous process. The acetylene is mixed with an equal volume of steam and passed through a spiral tube heated at 250 to 300° C. under a pressure of 5 to 10 atmospheres, which is a lower pressure than would be generated by heating the mixture of gas and water together to that temperature in closed vessels. The pressure in the tube and the velocity of the gases are controlled by means of a compressor and outlet valve. The tube is constructed of nickel steel and is preferably coated internally with gold. The yield of acetaldehyde in a single passage through the tube can be raised as high as 90 to 96 per cent by using small quantities of hydrating catalysts, such as 1 to 3 per cent of sulfuric acid, 3 to 5 per cent of acetic acid, sulfonic acids, or organic acid anhydrides. If it is desired to transform the acetylene into acetic acid in one operation, air or oxygen is introduced into the middle of the reaction tube, and acetic acid or acetic anhydride is employed as the catalyst. The gases pass out of the reaction tube into an expansion chamber and then through a series of condensers, unchanged acetylene being returned to the compressor.

Canadian Patent No. 214,163, November 8, 1921, to A. Guyot, covers the oxidation of acetaldehyde in the vapor state, by a gas rich in oxygen, in the absence of a catalyzer. The product is allowed to flow continuously from the oxidation towers to a heating apparatus where any peracetic acid formed during the oxidation is decomposed.

United States Patent No. 1,421,743, July 4, 1922, to B. C. Stuer and W. Grob covers the preparation of acetaldehyde for conversion into acetic acid, by the reaction of acetylene and steam at 400 to 420° C. in the presence of bog iron ore as a catalyst.

United States Patent No. 1,471,058, October 16, 1923, to H. Plauson covers the oxidation of acetylene to acetaldehyde or acetic acid in porous electrodes containing an insoluble mercury compound. The electrodes are maintained in an active condition by making them the anodes in an acid solution using 1.7 to 2 volts. The electrodes may be formed of a metallic net carrying a paste of mercurous oxide or phosphate. Phosphoric acid may be used as the electroylte, and in operating the apparatus for acetaldehyde production, yields of 94 per cent or more are claimed. In operating for acetic acid manufacture, a high yield of acetic acid, with a smaller amount of acetaldehyde is obtained. The products may be continuously distilled off as formed.

United States Patent No. 1,485,706, March 4, 1924, to G. Plauson specifies that various electrolytic oxidation processes, such as the manufacture of acetaldehyde or acetic acid, may be carried out in an electrolytic cell having an anode of relatively small surface area, as compared to the cathode, so that it can be heated to a high temperature.

British Patent No. 287,135, March 2, 1928, to J. Karpati and M. G. Hubsch, provides for the passage of acetylene mixed with oxygen, at 35 to 40° C., into acetic acid containing mercury sulfate. It is also specified that the acetylene and oxygen may be passed in alternately. An oxidation catalyst, such as cellulose or a wood sawdust, which has been heated in nitrogen and activated with steam, is specified.

British Patent No. 294,226, March 2, 1928, to the same inventors, covers the preparation of acetic acid by a method in which the acetylene, oxygen, and acetic acid, mixed with the catalysts, are circulated through separate systems having the reaction chamber in common. In this reaction chamber, acetic acid is sprayed downwards in countercurrent, first into acetylene until absorption ceases, and then into oxygen, alternately.*

The Canadian International Paper Co., as a result of several years of work at its laboratories at Hawkesbury has developed a new high grade of rayon pulp, which has been placed on the market under the name of Kipawa Extra. This new pulp produces a rayon of greater whiteness, better dyeing qualities, and greater strength than is commercially possible with the grades of pulp in general use. Kipawa Extra has been well received by the rayon industry and practically all the company's customers have now adopted this new quality.

Canadian Industries, Ltd., is again taking the lead in introducing a new product into Canada—cellophane. This action was officially announced by Arthur B. Purvis, president and managing director of the company, when he stated that Canadian Industries would build a $1,500,000 plant at Three Rivers, in the Province of Quebec, the largest pulp and paper center in the world, situated midway between Montreal and Quebec City.

This series will be continued in an early issue.*

Plant Management

A Department
Devoted to the Business Problems of Chemical-Process Production

Dollars and Sense

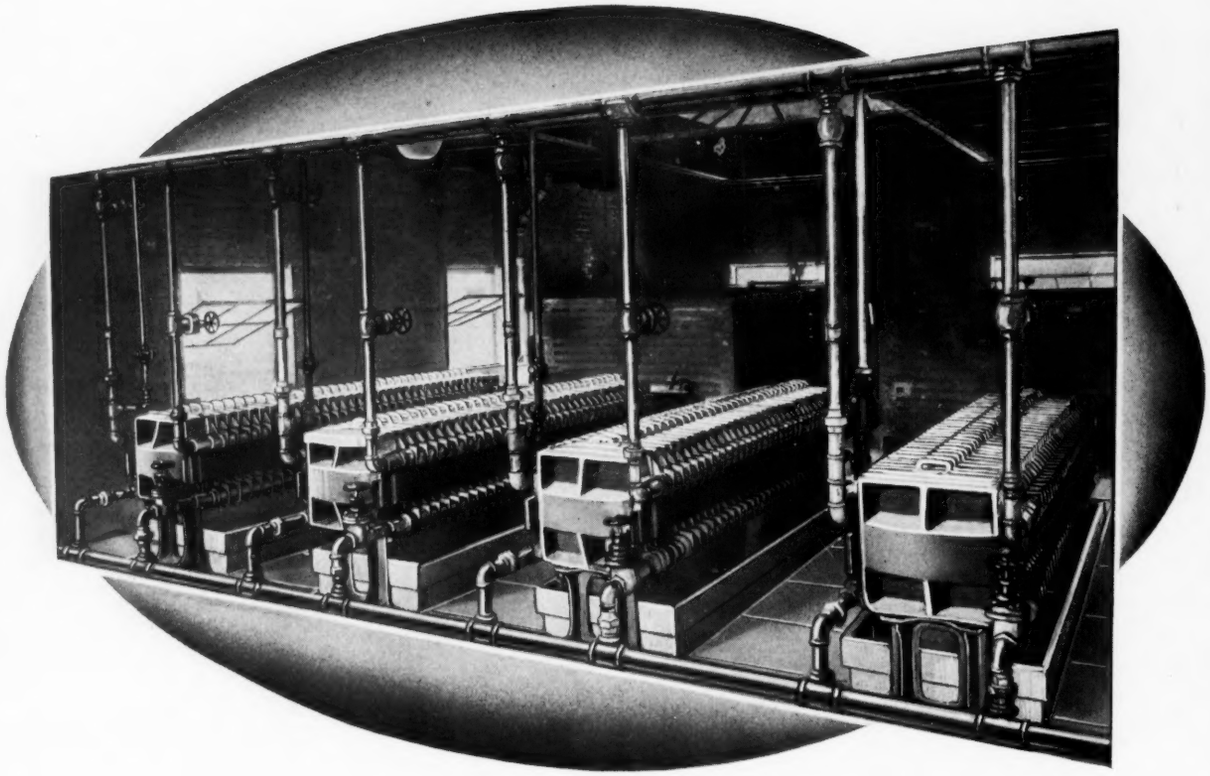
COAL and motor fuel are interwoven into one of England's serious economic problems, a vital matter closely connected with chemistry, a knotty puzzle for the solution of which the Government not unreasonably looks to chemists. In the House of Commons recently the British Minister of Mines, summarizing this situation, pointed out that between two and three hundred patented processes for producing various lubricating and explosive compounds from coal exist; but that, quite apart from their technical variations, one defect is common to all. Not a single one can be made to pay!

WHAT a clarion challenge is this. Here is a big, pressing problem of an inherently chemical character. A golden award awaits the chemist who discovers the solution, and he will win too, a niche in Chemistry's Hall of Fame beside such illustrious ones as Le Blanc, Farraday, Perkin, and Hall. Surely there is incentive and inspiration enough.

YET what a thundering indictment such a comment is.

Here is one of the pet projects of recent chemical research. Hundreds of patents have been secured for processes that ignore costs, overlook adequate supplies of raw materials, forget competitive selling price.

It is easy enough to forgive the technical man his economic foolishness on the ground that he is "different". But such excuses do not stop the appalling waste of time and money and brains expended in uneconomic research. A bloated, introvert spirit of pure science will not seek the solutions of tremendous chemico-economic problems for which scores of industries cry aloud today. Alibis based on his training will not raise the pay of the chemist unable to render the practical services the world demands. Absolution for such economic sins will be more difficult to win in the years ahead of us. Knowledge of costs and comprehension of markets will be prerequisites of the chemist's equipment. Teachers of chemistry in college will do well to so instruct their candidates for industrial service, since the directors of research in industry must demand such qualifications. Technical men already in industrial work should understand clearly that chemical management has no time for excuses; no money for moonbeam analysis; no energy to squander in the manufacture of synthetic rainbows.



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A Chemist Looks at Costs

By Bert S. Taylor*

THE cry for higher quality, lower cost, and new or better products has created a heavy demand for chemists and chemical engineers because of the discoveries and developments brought about by technically trained men of the past generation. The value of a technical staff is appreciated by all industry. Those forms of manufacture which are largely chemical depend wholly upon chemical developments for their business. Not only in chemical industry, however, but in fabricating industries depending solely upon mechanical means to transform raw materials into finished articles the chemist is of value. American industry owes much to the chemist as exemplified by men such as Dow, Baekland, and Langmuir, but it owes more in the aggregate to the thousands of unnamed chemists who are responsible for the high quality and strict uniformity of American goods today.

The rubber industry for example combines mechanical manipulation with chemistry. The process of vulcanization either with sulfur and heat or by sulfur chloride in the cold is a chemical process. Most of the formative processes, however, involve principally physical changes. Illustrations of the value of a chemist in industry and his place in the manufacturing world will be drawn from the rubber industry but his value could equally well be demonstrated by examples from other fields of manufacture.

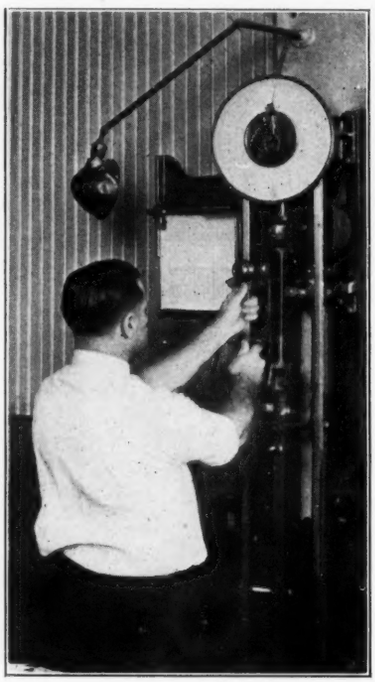
To industry the young chemist brings a background built on his university experience. One of the first reactions about which he learns as a student is that hydrogen combines with oxygen to form water. This is a clean cut quantitative reaction. Similarly, most of the reactions of elementary chemistry and even of advanced college work are straight forward according to theory and are used to demonstrate the theories of chemistry. It is not until he gets into applied chemistry in industry that processes, by-products and side reactions assume great importance to his mind. The combination of rubber with sulfur accomplishes certain ends which can be measured by the change in physical properties. It is impossible to explain this

*Manager Raw Materials Department B. F. Goodrich Co., Akron, Ohio

Special chemical laboratory at Goodrich Reclaiming plant for control of reclaimed rubber

change by any straight forward chemical explanation. Certain rules have been formulated to follow in the manufacture of rubber goods but even today with all the fundamental work which has been done very little is known about the chemical changes which take place during vulcanization.

In the university the student contacts with his fellows and with his teachers. With the former he is not forced to associate to any greater extent than he cares to. With the latter he seeks to establish a record of achievement based on recitation, laboratory reports and quizzes. Persumably the instructor can evaluate his knowledge of the subject which is being taught. Whether the man is shy, conceited, or possesses other qualifications which d e t e r m i n e how smooth and effective will be his human relationships is a matter of minor importance so long as he is able to convince the faculty that he has learned the lessons assigned. In industry, however, he faces a different problem. Not only must he be able to convince a critical immediate superior that he is capable of effective work but by sheer force of personality he must day by day convince those working at his side, whom he cannot escape if he would, that he is capable of steady, continuous effort, that he is ingenious (can use his head, they would say), possesses sound judgment and is absolutely honest in all his dealings. These human traits we sum under the term "Personality" and the chemist in industry must have the human touch, aggressiveness and a sense of humor, as well as technical ability and ingenuity if he is to win success.



Measuring stress strain. Physical tests are as important as chemical in control work

The chemist with four years training in a good college or university usually has sufficient grounding in the fundamentals of the science to attack most of the problems of the industry. Frequently, however, he lacks perspective in the particular industry which he is entering. He cannot tell without a broad view of its scope and processes what effect a change in materials or operations at one point will produce at another. Before he can avoid serious difficulties in his work he must have such knowledge. It has, therefore, become the practice in many firms to give young technical men entering their employ a special course of instruction to broaden their understanding of the industry and to bring them quickly to the point of effective operation.

Men entering our Training School start to work in either the general chemical laboratory or in the mill room. Men in the laboratory change places with men in the mill room until the whole group has had the complete period of training. In the mill room the men actually operate the large mixing mills, weigh out batches and assist in the preparation of calendered stock. This physical e x p e r i e n c e with the machinery of the rubber industry gives them a background which can never be lost and fits them for much better service later. During this preliminary training period talks are given by executives of the company and by leaders in certain departments of the organization. For example, there have been discussions of crude rubber, fabrics, rubber compounding, time study and almost every individual phase of rubber manufacture. It is not expected that the men will become efficient rubber technologists at once due to the three months training course which they receive. It is r a t h e r h o p e d that their interest will be stimulated in various fields of the work and that they may make a choice of the field in which they would best like to work. After all, this synthetic experience is exactly the same as that which is obtained all thru the field of education. We try to tell others in a short time the things which have been learned at the expenditure of a great deal of time and thought. If in order to become a good organic chemist every man had to prepare all of the compounds which have ever been made, before he could investigate new ones, there would be no progress.

Promotion out of the chemical laboratory at the close of the training period may be into any one of a number of fields of rubber manufacture. By this time the manager under whom the chemist has worked has had a chance to size up his ability and is able to place him to the best advantage. Chemically trained men have been placed in the sales department, in the purchasing department, and in the cost department. However, about 80% of the chemists ultimately go into one of the technical departments of the manufacturing division and most of these become compounders. The duties of the compounder are the control of the quality of the finished article, the making of adjustments in methods of manufacture or in the types of materials used in order that the finished article may meet the service required. It is also his duty to devise ways and means of reducing manufacturing and materials cost. One cannot consider any form of manufacture today without mentioning cost.

The reason the American chemical industry is in the position it occupies today is because of efficiency and cost reduction, which have been brought about in the last few years. The technical man too often forgets the cost side of the picture in looking at his results. This may cause him disappointment that many of his ideas are refused. Costing methods have their foundation in economics and common sense and are easily followed with an elementary knowledge of accounting principles. No technical man who enters industry should fail to take advantage of every opportunity to learn about costs. Most rubber goods are sold by the piece—that is, according to a fixed volume. Yet rubber and compounding ingredients are purchased by the pound. It is, therefore, desirable where service will permit to secure as large volume as possible for the number of pounds purchased. In determining the finished cost of rubber goods it is necessary to consider both the specific gravity and the pound cost.

A Background of Physics Necessary

The foregoing considerations apply equally to other branches of science as well as to costs. Physics and mechanics are being applied to the study of manufacturing methods to a greater extent now than ever before. A reaction which may go beautifully in a test tube may fail miserably on a large scale because of failure to consider the heat laws. The study of physical properties of rubber by means of stress strain data is merely applied mechanics.

A college alumni association in Cleveland has adopted the slogan "Don't just get educated; keep educated". For the chemist in industry this is wholesome advice. Chemistry is a dynamic science, industry is a developing organism, changes and improvements and new knowledge are ours to utilize every day. The chemist cannot remain inactive in a moving world. He must continue to learn, to do old things in new and better ways, to do new things that have never been done before. For the rubber industry the young chemist needs particularly broader knowledge of physics with special reference to mechanics and heat than he usually possesses. Other industries may require optics or electricity. Whatever the requirements, the chemist must use his own efforts to educate himself if he is to advance.

Control of quality is the prime function of the chemist in the plant. This control may be applied not only to the raw materials used in the manufacture of goods but also to packages, labels, wrapping paper, inks, adhesives and the hundred and one smaller materials which serve nearly every manufacturer.

Importance of Testing Raw Materials

The importance of raw material control is not appreciated unless a careful survey of usage is made. For example, we use zinc oxide as an aid to vulcanization in practically every rubber compound. In no compound is it used in any greater amount than essential because of its high volume cost. We may take five per cent of the total recipe as a representative amount. A carload of zinc oxide contains 80,000 pounds. Should the man analyzing this material fail to discover that it is off quality a tremendous quantity of finished goods would be lowered in quality. Of course, production control might catch the mistake in the factory, but this control could not function until a large amount of defective material had been produced.

Control of quality applies also to unfinished goods at various stages in the process. For example, in the electro-deposition of metals it is necessary to take an occasional sample from a plating tank in order to determine the concentration of metal salts in the batch. In the same way, in the rubber industry it is necessary

Goodrich experimental mill room. Here small batches of material are tried out before being used in the factory

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to run a control test for the amount of sulfur in a mixed batch before the batch can be cured. It is not always expedient to run a control analysis for sulfur on an uncured batch to be sure it will cure. It is generally more simple to cure a small piece of the mixed batch and if the vulcanized product seems to have the correct snap or hardness the mix is considered to be satisfactory.

The chemical control of the finished goods involves almost every form of analysis as does also the analyses of competitors' products. The development of service tests is also important work in the works laboratory of any plant. This does not usually depend upon an exact duplication of service conditions but rather upon an acceleration of certain factors which may cause deterioration of the product. Great care must be taken in this work that in running an accelerated test false results are not obtained. Many times if only one factor of breakdown of an article is considered, entirely wrong results will be obtained. Examples of this kind of work are testing of air hose, resistance of paint spray hose to lacquers, studies on tank lining compounds against special chemicals, the list is almost endless.

In addition to analytical work, the chemist in the works laboratory has an opportunity for a large number of plant problems. These plant problems are always the most interesting phase of the work for they involve not only rubber goods but almost every branch of manufacture and chemistry.

The following may give some idea of the varied nature of the plant problems which are submitted to our chemical laboratory:

The determination of the cause of defective hose couplings.

The development of a new tire paint for dressing a super grade of tires.

The cause of deterioration of the fabric used in conjunction with zipper fasteners.

Studies on the accelerated aging of rubber goods.

Solution of these plant problems requires a liberal amount of "horse sense" as well as chemical knowledge.

By analyzing the causes of breakdown or elimination of goods from service the designer of the product can measure quantitatively those factors which have brought about failure. This analyses of performance of a product in the field quite often leads to the installation of control standards in the factory so that subsequent articles may be of uniform and high quality. In the manufacture of platens for typewriters, cash registers and other types of printing machines, a definite hardness has been found to be essential. Hardness control for this type of goods, therefore, is part of the regular routine of manufacture.

In the university, accuracy is a prime requirement and speed is of relatively less importance. In industry accuracy of manipulation and accuracy of results are still demanded of a plant chemist. Speed of operation, however, assumes a larger relative importance. Speed is often of as much value as accuracy although the two must go hand in hand. A sample, perhaps one-half pound of accelerator, pigment, raw batch or other form, comes to the laboratory for test. This test must be rushed. Why? Because there are 20,000 pounds of batch stock held up until the tests are completed. These 20,000 pounds represent 50,000 articles or automotive parts which have to be shipped tomorrow. Unless fast work is done, factory production is shut down, deliveries are held up and sometimes even the customer's factory has to stop production because of slow chemical tests. The result may even be the loss of some important business.

Chemical and Physical Relationship

In certain instances a progressive chemical change is accompanied by a progressive change in physical properties. This is true in the vulcanization of rubber. The chemist who enters plant work very quickly finds that there are faster ways to measure the degrees of vulcanization than by the analyses for combined sulfur or even by the determination of stress strain or tensile strength. Hardness is much used as a control test for the determination of the curing ability of batches of rubber in process. Given a sample of rubber, it may be cured and the hardness determined in 20 minutes. The determination of total sulfur by the ordinary method of chemical analysis will take not less than 24 hours. The sulfur determination requires chemical laboratory accuracy, careful weighing, preparation of reagents, ignition of the final barium sulfate precipitate. The hardness control test requires only curing the sample in a heated press and measuring the amount of compression under a fixed load for a definite time. Often for the sake of economy, a chemist must desert his chemical procedure for a faster test after a definite relationship to the chemical change is established.

Industry has progressed in stages. First came the inventor who devised a new machine, a useful material, a novel article. Then the engineer took control, devised effective methods of production, reduced costs and standardized the product. Finally the research scientist entered the field, analyzed the products, and the processes of manufacturing into their physical and chemical components, measured progressively the effects of varying compositions and methods of production and put the industry on a scientific basis. All industry has not gone this far. There is still a broad field of endeavor for the research chemist and research physicist.

As we look back thru the years to the time of Charles Goodyear the relative unimportance of rubber in his day is surprising considering the fact that today it is considered a necessity in many lines of manufacture. At that time it might be compared to the importance of shellac today. There were no outstanding characteristics which made it of extreme

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value and for which it alone could be used. From a substance which in winter was hard and brittle and in summer was soft and sticky the discovery of vulcanization by Charles Goodyear in 1839 changed it to a material of extremely desirable physical properties. The developments of the chemist have been of primary importance in bringing about the extended usage of rubber. After vulcanization was discovered the number of products in which rubber could be used became more and more diversified and during the 19th century a large number of mechanical goods were developed which had been impossible previously because there was no known material from which to make them. There are many people today who can remember when the first automobile tire was made and yet this article is the one which consumes the greatest quantity of rubber and rubber compounding ingredients. It is safe to say that the rubber tire today makes other rubber articles cheaper thru increased production of raw materials and yet the development of the tire was only possible by using the experience gained in manufacturing other forms of rubber goods and by the scientific investigation of rubber compounds. Today the chemical industry is supplied with rubber lined tanks and pipes for handling corrosive liquids, ventilators and fans for acid fumes, belts for conveying dry chemicals and food stuffs, hose tubing, valve and pump parts. Finally there is a rubber lined tank car for delivery of the product which must be kept free from contamination.

The Trouble Finder

It is evident that in order to apply new materials and methods on a production basis there must be in the production organization technical men, chemists, physicists, engineers, capable of understanding the principles and methods involved in production to detect immediately the causes of difficulties, to remedy them, and to pick up quickly the results of laboratory studies and translate them into profitable manufacturing processes. The foreman or manager of a production department who understands the technical nature of the product he is making is better able to keep his department running satisfactorily by catching troubles at the outset rather than after money has been wasted thru the production of large quantities of defective goods.

The reverse of this condition is just as necessary. There are needed in the research laboratory of chemical industries men who have had production experience. These men, thru their experience, realize the needs of the production departments and by putting these needs on a working laboratory basis quite often can solve the production problems much faster than a man who has had no plant experience before entering research work.

It is not uncommon for users of manufactured products to fail to secure the expected service from the articles they have purchased. They do not know the conditions under which the materials from which the article is made will yield the maximum satisfaction and length of useful life. Even though these are known they may be unable to change their own processing to secure the greatest benefits. The manufacturer of the original article is faced with loss of business. In such situations the technical man again offers his service. Frequently his personal investigation of the users operations will indicate how satisfactory service may be secured either by modification of the goods or of the user's process. The difficulty is removed and a more loyal customer is retained. This is not exactly a sales job but combines the work of development with that of the application of manufactured goods to certain requirements. The large corporation today owes its success to the service rendered to its customer. For example, the automotive industry purchases large amounts of miscellaneous rubber goods. Every rubber manufacturer has one or two developement men who can go into the automotive factory and determine its needs and develop articles of rubber that will fit the service required. This kind of work requires a good deal of experience not only in chemistry but engineering. Sometimes it is necessary to convince the purchaser that the particular type of article which he wants will not fit the needs at all but that something entirely different can be made to do a more satisfactory piece of work. Ingenuity in demonstrating the applicability of ideas and a sound knowledge of engineering are necessary to success in this field service work.

In every chemical industry there are men who have been affiliated with that particular type of manufacture for ten, twenty and thirty years. Only a few of these men are technically trained but they have one great asset which the new chemist does not possess—namely, experience. Entirely too often the intolerance of a young technical man for the experience of an older man has hampered his progress. The rubber industry is founded on the work of chemists and chemical engineers. It has presented an opportunity for service to technical and non-technical men alike. The chemical industry today in its highly competitive position requires of all its technical men the maximum of service and loyalty.

Knowledge of Materials Required

The men in charge of chemical industries in general appreciate the difficulties of new men coming into the organization and what I have said of the necessity for control, accuracy, and speed as well as the personal qualifications applies equally to all industrial work. The basis for success in any chemical industry is to learn the most about the materials which that industry uses and about the best methods employed in using these materials. These requirements coupled

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with a sound fundamental knowledge of that part of chemistry and chemical engineering which is the foundation of the particular industry, play a major roll in the success of the chemist.

Equipment Bulletins

Plant Managers, plant engineers, consultants, those in charge of operations, and purchasing agents will find in this column valuable suggestions in the way of new booklets bearing on equipment, etc.

The Plant Management Department of Chemical Markets will be glad to forward requests for the above booklets to the proper channels for attention should this be preferred.

General Electric Co., Schenectady, N. Y., has issued GEA-937B, a price list and descriptive booklet of textolite laminated, textolite molded plastic materials.

LaMotte Chemical Products Co., McCormick Bldg., Baltimore, Md., has issued a 12 page pamphlet explaining the new LaMotte outfit for the chemical control of boiler feed water.

Combustion Engineering Corp., 200 Madison Ave., N. Y. City, has available Catalog SG1 describing the combustion steam generator, a complete unit, simple, compact, high efficiency and minimum operating and maintenance costs.

Douthitt Engineering Co., 221 N. LaSalle St., Chicago, Ill. has completed a comprehensive booklet describing the Gray-Jenson Spray Process Drying Plant and The Sheffield Continuous Process Casein Plant.

General Electric Co., Schenectady, N. Y., has issued its Industrial Control Catalog, GEA 606C for 1931.

Elliott Co., Jeannette, Pa., has issued a new bulletin, No. C-7, profusely illustrated on the economies of surface condensers. Contains very valuable engineering data on the subject.

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y. has mailed out general catalog, No. 1,000 describing in detail the complete Tagliabue line of recording and controling instruments.

E. I. du Pont de Nemours, Industrial Finishes Division, Parlin, N. J., has issued a 20 page booklet describing a new clear lacquer for metal protection. A comparison of competing products is made by means of a series of exhaustive tests.

Government Supplies "Akron" Helium

The new giant Naval airship, "Akron," recently christened and which is soon to take its maiden voyage, depends for helium on the Government plant near Amarillo, Texas, which was designed and constructed and is operated by the United States Bureau of Mines, Department of Commerce. More than 6,000,000 cubic feet of this rare non-inflammable gas has been shipped from the Amarillo helium plant, which is operated under the supervision of Scott Turner, director of the Bureau of Mines, and R. A. Cattell, chief engineer, helium division. The plant is in direct charge of C. W. Seibel, supervising engineer.

Although the establishment at Amarillo has been in operation only a little more than two years, it has produced more than 22,000,000 cubic feet of helium at an average net cost for that period of $11.47 per thousand cubic feet. An indication of present improved plant performance, brought about through experience in plant operation and improvements in process and equipment constantly introduced is given in production figures for June, 1931, when the net cost of $5.95 per thousand cubic feet was attained.

The study of Poland's chemical industry is issued as Trade Information Bulletin No. 762. It may be obtained for ten cents from the branch offices of the Bureau of Foreign and Domestic Commerce located in most of the larger cities, or from the Superintendent of Documents, Washington, D. C.

New Incorporations

New Jersey Charters

Embe Rayon Processing Co., Inc., Paterson—Louis Nussman, Paterson, $25,000.

Improved Lubricants, Inc., Jersey City, petroleum products—J. G. Michell, N. Y. City, $10,000 pf., 2,000 shs. com.

Molwin Silk Co., Paterson—Mendelsohn & Mendelsohn, Paterson, 1,500 shs. com..

New York

Broadway Chromium Plating Co.,—S. D. Levine, 26 Court St., Brooklyn, 50 shs. com.

Elk Oil Co., chemicals—Schmer & Wechsler, 11 W. 42 St., $10,000.

Ferguson Laboratories, chemicals—H. Wandmaker, 26 Court St., Brooklyn, $25,000.

Irving Goldman & Co., paints—Wise & Ottenburg, 206 B'way, N. Y. C., 100 shs. com.

Manhasset Chemical Co.—B. Gassman, 63 Park Row, N. Y. C., $30,000.

Schwarz, Chemist, paints—S. E. Levine, 570 5th Ave., 25,000.

Seaboard Dye Wks.—A. Weiss, 154 Nassau St., $5,000.

Delaware

Johnson's Products Corp., Wilmington, Del., drugs, chemicals—M. M. Lucey, Wilmington, $100,000.

A. S. T. M. Committee's Report

A. S. T. M. Committee D-1 on Preservative Coatings for Structural Materials through the Secretary, P. H. Cathcart, Chemist, National Lead Co., Brooklyn, has submitted a report of its major activities for the ensuing year. The committee is continuing its work on methods of testing the weathering characteristics of protective coatings. Much progress has already been made and it is hoped a great deal more will have been accomplished when the 1932 annual report is to be submitted. The evaluation of the hiding power of white paints when applied over black and white surfaces will continue to be studied.

A new subcommittee of Committee D-1 has been authorized to undertake work which will lead to specifications for pipe priming coatings which will be applied at the mill. This work is of vital interest to the oil line and gas industries, and it is of course of equal interest to the producers of pipe.

The Subcommittee on Turpentine is working on new specifications to cover all the types of turpentine now available. The various groups of the Sub-committee on Cellulose Ester Coatings have been quite active and new projects will be investigated. Three specifications and methods of test were recommended for publication. These are: Proposed Tentative Specifications for Acetone, Recommended by Sub-committee XXV; Proposed Tentative Specifications for Beta Ethoxy Ethanol (Synthetic), recommended by Sub-committee XXV; Proposed Tentative Specifications for Beta Butoxy Ethanol (Synthetic), recommended by Subcommittee XXV; Proposed Tentative Method of Test for the Tinting Strength of White Pigments, recommended by Subcommittee VIII; Proposed Tentative Methods of Testing Nitrocellulose Clear Lacquers and Lacquer Enamels, recommended by Subcommittee XXV.

The Steel Barrel Institute consolidated monthly report for July shows total volume of business for 16 reporting members to be $696,835.28. Actual production compared with possible capacity for the several grades was as follows: I. C. C. barrels and drums, 250,625,5.9%; light barrels and drums, 883,125,33.6% total for all types, 1,133,750,27.4%. A total of 5,941 I. C. C. black, 8,257, I. C. C. hot-dip and galvanized, 370 I. C. C. black removable head friction cover and 208 I. C. C. hot-dip and galvanized. Figures for drums not of the I. C. C. requirements were as follows; black 248,808; hot-dip and galvanized 1,865; in the removable head friction cover group, black 45,437, hot-dip and galvanized 413. A grand total of 476,720 drums on order remained unfilled on the last day of July.

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Recording Sales and Sales Costs

A Practical System

By J. M. Pratt

A serious objection to the general run of cost accounting theories is that they are not specific enough to warrant study by thechemical industry. In this article, Mr. Pratt overcomes this objection by discussing a very practical method employed by a well-known manufacturer and jobber in the chemical field.

THE Rohm and Hass Company has developed a special form of sales register which has proven of great value. It is obvious of course, that it is of the utmost importance that accurate and available records are kept of the sales. Also, means must be provided to assure that all shipments made from the plant have been invoiced during the month in which the shipment was made. Accordingly, a daily record of all stocks are kept by the Rohm and Hass Company showing: (1) Quantity of finished stock on hand at the beginning of the day; (2) production for the day; (3) shipments made during the day; (4) finished stock on hand at the end of the day. This record shows only units (pounds) and the number of packages, as the material is packed in each department daily.

At the close of each day the department foreman sends to the cost department a report of the actual stock on hand. This report is checked immediately with the daily record of stock on hand. Should there be a discrepancy an investigation is made immediately to ascertain where the difference occurred. The advantage of knowing immediately of a difference is that it can be very easily traced. Should a difference be allowed to go undetected for even a week it would be a difficult task to determine whether it was in the production reported or in the shipments. At the end of each month, this record shows the totals for the period of production and shipments of each product.

A report is made to the general office showing the total amount of each product shipped during the month. This report is correct as it is part of our daily inventory record. It is checked with the total pounds for each product as shown by the sales sheets. This check determines that all shipments have been invoiced by the billing department. After this verification has been completed, the sales register form, page 285 is filled in and forwarded to the cost department, the amount of sales being omitted and only the pounds sold and packages being shown.

The cost department calculates the costs of the merchandise sold and the packages, and returns the sales register to the general office where the amount of the sales is then filled in and the sales register completed. The purpose of the various columns shown on the sales register sheet are numbered for identification.

1. In this column appears the name of the product.

2. This column is used where there are grades or kinds of the same product such as shown by the products acetic acid and ammonia alum.

3. In this column the total pounds of each product sold is shown.

4. The cost price is noted in this column and is for 100 pounds unless otherwise specified.

5. Column 5 shows the cost in dollars for each grade or kind, the total being shown in column 7.

6. The account number to which the cost of sales and sales are posted individually is shown here. This is the key number, the cost of sales accounts being designated 400 accounts and the sales accounts 300 accounts. For example, cost of sales for caustic soda would be 401, and the sales account 301; and so on.

7. The total cost of sales column shows the total cost of each product.

8 and 9. The sales column shows the sales for each kind or grade of a product, the total being extended to column 9. This is illustrated by products acetic acid and ammonia alum.

10. These columns show the distribution of the various packages, the number of each kind of package per product being shown as well as the cost per package.

11. These columns show the total cost for each quantity of packages as shown in the columns under 10. The total cost of the packages for each product is extended in the last column total under package cost.

It will be noted that the expenses shown in the subdivided space expense distribution are not entered in the same division as the sales. This is because the items have been charged to the customer on the sales

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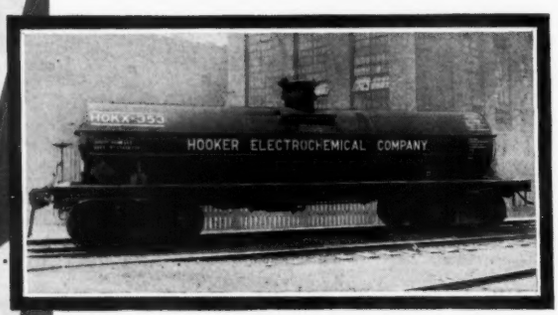
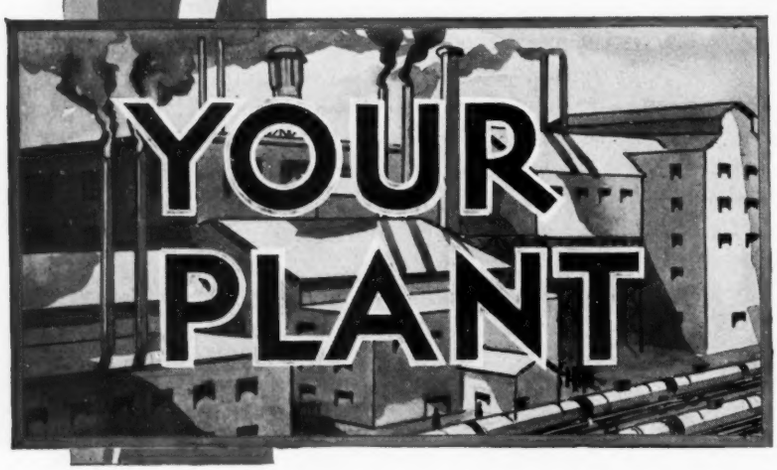


LIQUID CHLORINE TANK CAR



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WESTERN
PLANT—TACOMA, WASH.
SALES OFFICE:
TACOMA, WASH.

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1017

		Costs				Sales			Package Costs									
1 ACCOUNTS	2 WGHT.	3 TOTAL WGHT.	4 COST PRICE	5 COST OF SALES	6 ACCT. NO.	7 TOTAL COST SALES	8 SALES	9 TOTAL SALES	10 PACKAGES					11 AMOUNT				
									.50 CBY.	BBLS.	KEG.	BAG	MISC.	CBY.	KEGS BBLS.	BAGS	MISC.	TOTAL
CAUSTIC SODA		5,000	10.00		1	500.00		1,000.00		1.50 25					37.50			37.50
COPPERAS		500	5.00		2	75.00		150.00		2.00 2	1.00 1				5.00			5.00
BICARBONATE SODA		6,000	8.00		3	480.00		1,020.00		1.75 10		7.5 10			17.50	7.50		25.00
ACETIC ACID, NO. 8	4,000		6.00	240.00			500.00			2.00 10					20.00			25.00
" " , NO. 12	1,000	5,000	7.50	75.00	4	315.00	200.00	700.00	10					5.00				
AMMONIA ALUM, GROUND	2,000		4.00	80.00			140.00					1.25 10				12.50		
AMMONIA ALUM, LUMP	4,000	6,000	5.00	200.00	5	280.00	450.00	890.00		3.00 10		100 10	50 2 BX.		30.00	10.00	3X1.00	53.50
		22,500				1,650.00		3,460.00	10	57	1	30	2BX.	5.00	110.00	30.00	1.00	146.00
EXPENSE DISTRIBUTION:																		
FREIGHT					101	300.00												
POSTAGE					102	75.00												
INSURANCE ON SHIPMENTS					103	100.00		475.00										
TOTALS		22,500				1650.00		3,935.00	10	57	1	30	2BX.	5.00	110.00	30.00	1.00	146.00

invoice and are therefore credited to the proper expense account, and are not included as part of the sales.

It is very important in sales distribution that these expense items are credited to the proper expense account, rather than to sales account. The sales account then shows only the actual sales of merchandise and is not inflated with these expense credits.

Should an allowance be made to a customer for freight, postage, or the like, these items are shown as debits in the expense division and accordingly charged to the proper expense account.

The posting of the sales register after it is completed is a very simple method of procedure as follows: (1) Cost of sales account is debited; (2) finished stock account is credited; (3) sales account is credited; (4) expense account is credited; (5) customers accounts receivable account is debited; (6) package expense account is debited; (7) package inventory account is credited.

In making the above postings, these accounts are all controlling accounts. Therefore, in posting it is only necessary to post the totals to these controls, the details being posted to the subsidiary ledgers and cost cards.

Information Available At Once

In conclusion, we find this form very practical. It lends itself to quick anzlysis for any information we may desire to compile from time to time. The element of error is minimized, due to the fact that in addition to the verification of sales the costs must be correct, otherwise the average cost of the finished stock on hand would show a variation, being either too low or too high as compared to the cost shown on the sales register.

Chemical Construction

Virginia-Carolina has awarded the Austin Co., the contract for a $100,000 fertilizer plant at E. St. Louis, Ill. This marks the entrance of Virginia-Carolina into the mid-west. The St. Louis office of Austin will supervise construction.

Petroleum Chemical, jointly owned by Barnsdall and National Distillers is considering plans for the expansion of its plant at Barnsdall, Okla., or the erection of a new plant nearer the East for the manufacture of secondary butyl alcohol.

Roy Rannels, engineer of the Pacific States Pulp & Paper Co., Priest River, Idaho, reports consideration of a $75,000 plant for the manufacture of sodium sulfate.

Dominion Tar and Chemical, Toronto, is adding to its plant a new unit at a cost of $250,000, which will be completed by the end of the month. It will be specially devoted to the production of phenol, cresol, and cresylic acid, which are used largely in the manufacture of synthetic resins from which bakelite and numerous allied products are derived. This is an entirely new line of production for Canada.

J. J. Seguin Co., St. Lambert, Que., is adding to its extensive creosoting plant a new unit, consisting of a treating plant costing $200,000. It consists of a cylinder eight feet in diameter and 107 feet in length, for the pressure treatment of railroad ties, bridge timber, and large structural timbers.

American Manganese Steel, Chicago has secured a site in Montreal on which it will erect a branch factory, at a cost of approximately $2,000,000. The company will manufacture amsco manganese steel castings, machinery and machinery parts as well as Fahralloy heat and corrosion resisting castings.

4 Definite Buying Advantages

If you concentrate your Aqua Ammonia buying and choose The Grasselli Chemical Company as your source of supply, you at once assure yourself of these definite factors:

1..An old-established house that has been manufacturing chemicals since 1839.

2..Prompt service assured by convenient shipping facilities in 19 cities (listed below).

3..A product that is commercially pure, uniform, of high quality and testing 29.4% NH_3 (Ammonia).

4..Prices that are right.

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CLEVELAND *Incorporated* OHIO

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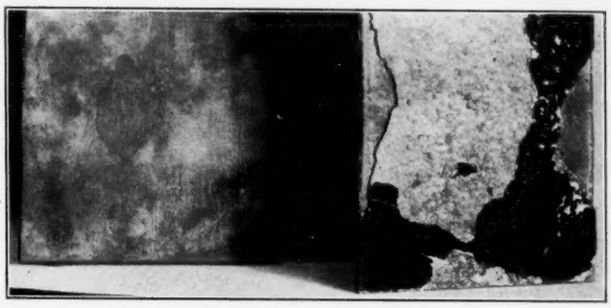
SAN FRANCISCO—576 Mission Street

LOS ANGELES—363 New High Street

Equipment Ideas

Economics of a New Composite Steel

Industrial Welded Alloys, Inc., New York City, has announced Plykrome a new composite steel with an integral stainless surface. This product has a very important economic value because of possible savings in many instances where stainless steels have heretofore been employed. Plykrome is a composite metal in which stainless steel is veneered and completely weld-bonded to



A specimen of 18 gauge Plykrome which had been exposed for a period of weeks to heating to 1600° F. in a gas fired furnace, then cooling and heating again. The stainless ply side (left) shows the 18-8 alloy unaffected. The mild steel has oxidized and destroyed itself

a mild steel slab, and then rolled on a mill to form an integral plate or sheet. Many problems were encountered in the development of this revolutionary product. Oxidation, the great detriment to welding, had to be prevented. The weld between the two had to be so constructed as to permit the expansion of the alloy under the influence of increased temperature without breaking its bond with the steel. Welding had to be accomplished at controlled temperatures which would be effective with the alloy metal but not harmful to the mild steel. The primary uses to which Plykrome will unquestionably be applied for the chemical process industries is to prevent the enormous loss to industry in the destruction of steel by corrosion and oxidation. With the possibility of checking these destructive agents at the surface, the steel body beneath becomes everlasting, whether it be in the form of a tank, pressure vessel or pipe line. This new composite metal has been and can be produced with its stainless alloy component of any of the analyses required—14-18% or 28-30% chromium, 18-8 or 25-20 chrome nickel (using Allegheny Metal, Nirosta, Rezistal, KA2S, or other mill makes) Nichrome, Hasteloy, etc. It is obvious that Plykrome will be less expensive than the solid alloy. It also has the definite advantage of greater ease and economy of fabrication.

Alsop's New Filter In Production

Alsop Engineering Corp., 39 W. 60th St., N. Y. City, announces the addition to their line of liquid handling equipment, a new type of filter. Not only does this type of filter produce, it is claimed, a crystal clear brilliant product it produces these results on the very first drop that comes through the filter, thus eliminating the tedious and time wasting recirculation of the liquid that has previously always been necessary. The human element which has been such a necessary factor in obtaining real filtration results in the past, does not enter into the operation of this new type of filter at all. The operator, experienced or otherwise, has absolutely nothing to do with and cannot effect the ultra-fine filtration which the machine produces from the very start. It has not been necessary to sacrifice filtering speed to obtain these results and it is claimed that a more brilliant product will be obtained in less time on most products than with any other type filter of a comparable size. A very complete range of sizes will be available from a small bench model for laboratory experimental work or very small production, up to a unit that will take care of very large production work where time is an essential factor.

After a test has been run on a sample of any liquid in the manufacturers own laboratory it is possible to guarantee definite and specific results both as to quantity and the time required to handle it. The adaptability of this filter to any filtering problem can therefore be determined in advance and Alsop, state that they are cooperating in test runs on any samples submitted to them. To take care of unusual or active chemical reactions with the filters they will be available in most of the commercial metals such as the aluminum, bronze tinned or nickel plated, monel metal, etc.

Government Bulletins

Information Circulars—U. S. Bureau of Mines

6453. Thallium; by A. V. Petar. 6 p.
Presents information on history, occurrence, uses, production, and marketing.

6455. Zirconium. Part I. General information; by E. P. Youngman. 30 p.
Discusses economic features and gives general information regarding the metal and its compounds.

6456. Zirconium. Part II. Domestic and foreign deposits; by E. P. Youngman. 63 p.
Summarizes data upon occurrences of zircon and baddeleyite. Eudyalite and cyrtolite are also discussed.

6462. Methods and costs of mining quicksilver at the New Idria mine, San Benito County, Calif., by W. R. Moorehead. 15 p. 8 illus.

6488. Methods and costs of milling feldspar at the Minpro plant, Tennessee Minerals Products Corporation, Spruce Pine, N. C.; by B. C. Burgess. 22 p. 13 illus.

Company Booklets

Glyco Products Co., Bush Terminal Bldg., 5, Brooklyn, N. Y. has issued a booklet describing "Plastic Wax" a concentrated emulsion of carnauba wax which, on drying leaves a lustrous film without the necessity of polishing. This coating is water-repellent, adhesive and non-inflammable. Economically it is of interest because of its low cost.

Vanadium Corp., of America, 120 B'way, N. Y. City, has mailed the July quarterly issue of the Vancoram Review, a resume of current literature on vanadium, its alloys and compounds. Copies may be obtained by applying to the company's main office.

E. I. duPont de Nemours, Wilmington, Del. The current issue of the duPont Magazine contains a very interesting account of the history of the Grasselli Chemical Co.

Silica Products Co., 700 Baltimore Ave., Kansas City, Mo., Bulletin 107 prepared to give complete data on bentonite and its varied uses.

Grasselli Chemical Co., Pigment Division, 256 Vanderpool St., Newark, N. J., is issuing a booklet, "Formulation of Flat Paints". A concise treatise on the subject of flat paint formulation.

United Carbon Co., Charleston, W. Va., has available for distribution to paint and varnish chemists reprints on the "Influence of Physical Properties of Carbon Black on its Tinting Strength," a paper by E. P. W. Kearsley and G. L. Roberts of its research laboratory. The paper was presented at the spring meeting of the American Chemical Society at Indianapolis in April.

Spencer Kellogg & Sons, Inc., Buffalo, N. Y., are preparing a new edition of "Laboratory Letters." The booklet contains short chapters on the latest theories on the drying of oils, colloids, rancidity, after yellowing, etc. The booklet also contains interesting pictures of the various raw materials from which the oils are obtained.

Missouri Pacific Industrial Development Department, St. Louis, Mo., has prepared a booklet and map showing raw materials and plant locations for the chemical and process industries on its lines and those of its connections. A valuable contribution to those contemplating new fields.

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CHEMICAL MARKETS

The Business Magazine of the Chemical Industries

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Chemical Facts and Figures

Chemical Industry Represented at Freight Rate Hearings—"Cosach" To Be Investigated—Solvay's 50th Anniversary—Chemical Executives on Gifford Committee—"Borax" Smith Dead.

Freight rates and nitrogen continued to share first place in the chemical news. Shippers had their inning, Aug. 12-13, before the Interstate Commerce Commission in opposition to the granting of a horizontal 15 per cent increase in rates,

Warren N. Watson

while in Paris a majority of the synthetic nitrate producers apparently had reached some kind of a tentative arrangement on production figures although the former cartel was not operating. In this country, the President's Muscle Shoals Commission was receiving bids, or at least had solicited bids for the property and plant.

At the freight rate hearings, the fertilizer end of the chemical industry was represented by D. A. Dashiel of Norfolk, Frank G. Moore, Davison Chemical and A. D. Whittemore, general traffic manager for American Cyanamid.

The Manufacturing Chemists' Association was represented by Warren N. Watson, secretary of the Association and by Harry M. Mabey, general traffic manager, Mathieson Alkali, who spoke for the Association's committee on traffic affairs.

Generally speaking the stand taken by such chemical traffic experts, as Mabey and Whittemore was essentially as follows: first a recognition and admission that railroad income has fallen off; second, that the proposed horizontal increase of 15 per cent is more likely to further aggravate the present unhealthy condition, than it is to remedy it and finally, that it is essential that all the facts be placed before the Commission, including the probable effect such a rate increase would have on the chemical industry before that body undertakes to grant the carriers' broad request. While technically opposing the increase before the Commission, these experts were so doing, not because of any inherent hostility to the railroads, but because of the strong belief that such action as a general 15 per cent increase would work considerable harm not only to the chemical industry but to the carriers as well. In this stand they were more frank than the representatives of other industries, which by their silence are lending support to the carriers' proposal, while quietly contemplating and arranging for other modes of transportation.

Warren N. Watson's testimony was brief, merely outlining in a few sentences the history of the Manufacturing Chemists Association, the reasons for the Association's interest in the hearings and introducing Harry M. Mabey as the authorized representative of the Association on traffic matters.

Mr. Mabey's expert testimony and cross examination covers almost seventy type-written pages in the records, not including six or seven charts and accompanying explanations of these charts. It can only be summarized but briefly.

By means of charts Mr. Mabey showed the Commission that railroad tonnage is in direct relationship to production. That because the practice of carrying large stocks on hand is a thing of the past and that the idea of selling direct to the consumer is continually growing, railroad carloadings is a very accurate barometer of how business is at any given moment. The witness went on to state that a canvas of the Association's membership showed a decided belief on the part of manufacturers that an increase in carloadings is confidently expected this fall.

Recalling the effect of a similar horizontal increase in freight rates which was made in 1920, one of the most striking utterances was, "I think the experience of the last 11 years has shown clearly that you cannot raise rates arbitrarily in a horizontal manner and then produce four to five hundred million dollars of revenue a year, just like waving a wand. There is a factor of business there which has to be considered, and was considered in the reduction of every one of these rates which was made by the carriers themselves."

Among the many points brought out by the Association's expert was the fact that chemicals as basic materials are raw materials from which very often other raw materials are made and therefore go into

Harry M. Mabey

transportation again. A horizontal increase in the case of the chemical industry often pyramids itself in a great many instances.

Mr. Mabey pointed out to the Commissioners the telling facts that it will be impossible for the industry to pass the rate increases on to consumers for the very simple reason that keen competition pre-

THE MONTH REVIEWED

August

1 Zinc cartel is declared operative (256).

5 Chemical companies ship via air freight (rotogravure).

10 I. C. C. cancels commodity rates to the South (292).

13 Harry M. Mabey testifies at freight rate hearings (289).

17 American Cyanamid reports for year ending June 30 (298).

20 Foster Wheeler seeks injunction against Soviet for refringement of patents on oil machinery (291).

26 Paris cable announces agreement in principle between several European nitrate producers (290).

27 "Borax" Smith dies in 85th year (293).

31 A. C. S. Meeting well attended (267).

vents such a possibility; that higher freight rates would decentralize the industry in order to secure shorter hauls; that higher rates would drive companies from competing in many areas; that high rates would force many companies into manufacturing products which they are at present buying from outside sources; that a 15 per cent rise in rates would drive more short hauls and even moderately long haul business to the truck and that other modes of transportation such as pipe lines and inland waterways would be adopted. That once they were, steam roads would find it highly difficult, if not impossible, to regain such tonnage. He further pointed out that a large percentage of industrial chemicals are sold on a yearly contract basis and any change before the first of next year would place an unfair burden upon the industry. Another important consideration was the question of our export business. Any tinkering with export rates now would most certainly reflect itself in further reduction in export tonnage figures. One of the most pertinent facts disclosed by Mr. Mabey's testimony was that trucking rates bear little direct relationship to railroad freight rates. Dollars and cents are the first consideration. The chemical industry, Mr. Mabey stated, has no choice but to cut transportation costs to the bone and the cheapest method of moving material will get the business. In concluding, the witness proved quite conclusively that the contention of the railroads that in the past ten years rate after rate has been whittled away was merely a subterfuge, that the railroads themselves had consented to such cuts only when they had become convinced that by so doing a sizable amount of business could be secured, that there is a rate at which it is profitable to move chemicals and anything above this rate simply stops sales and freight movement.

Industry Localized

Of great moment to the chemical industry is the fact, which Mr. Mabey pointed out, that both the chemical producers of this country and the consumers of these products are located over whelmingly in official classification directory (i. e., east of the Mississippi River and north of the Ohio-Potomac Rivers) and that increases in their freight rates are already scheduled to take effect December 3, 1931. To make such increases still greater by the additional imposition of a 15% horizontal increase in the rates thereafter, with the resulting disturbance of relationships between producing points, makes this proceeding of particular importance to the chemical industry.

James M. Doran, Commissioner of Industrial Alcohol, has returned to his desk after an absence of several months spent in Europe.

COMING EVENTS

American Paint and Varnish Manufacturer's Association, Drake Hotel, Chicago, Dec. 2-3.

American Scientific Congress, Mexico City, Feb. 5, 1932.

Eleventh Congress of Industrial Chemistry, Paris, Sept. 27-Oct. 4.

Faraday Centenary Celebration, London, Sept. 21-Oct. 3.

National Paint, Oil and Varnish Association, Atlantic City, N. J., Oct. 5-8, Hotel Ambassador.

National Safety Council, Chicago, Stevens, Oct. 12-16.

New International Assn. for Testing Materials, Zurich, Switzerland, Sept. 6-12.

Salesmen's Association, Third Golf Tournament, Briarcliff Lodge, Sept. 15.

Third International Conference Bituminous Coal, Pittsburgh, Nov. 16-21.

Nitrogen Agreement

Interest in nitrogen was divided between developments abroad and new angles to the ever-present Muscle Shoals problem here. Denials to the contrary, representatives of the various European synthetic nitrate producers continued to carry on informal discussions looking to finding some basis for agreement. At the beginning of the month ammonium sulfate producers in England announced a price of £6 10s. per ton up to June of next year. To this drastic cut was added a reduction in cyanamid prices. Momentarily synthetic nitrate prices were quoted unchanged from former levels, but no tonnage was exchanged at these figures. The Chilean "Cosach" on Aug. 14 announced a price reduction for Europe. Despite this action, belief existed that some international agreement was still possible.

The situation continues to be confusing. On the 25th, a representative of the Imperial Chemical Industries was reported as stating "there has been no resumption of negotiations for a world agreement on nitrogen. In view of the causes of rupture at Lucerne and of the present situation it is considered improbable that such negotiations will be resumed in the near future. The only agreements actually reached are those by which the German and Belgian governments have prohibited the importation of all forms of nitrogen except under license. The Chileans also have had informal conversations with Belgian synthetic producers with regard to domestic prices in Belgium during the coming season."

On the very next day a cable was received from Paris stating that a nitrate production agreement had been reached in principle by Belgium with Germany, Norway and England, and that although France had not signed the pact, she was sympathetic to the plan and negotiations were expected to take place to fix France's quotas. Several of the European governments which have prohibited the importation of nitrogen fertilizer material have signified their intention of passing upon import licensing agreements. It is quite possible that the "Cosach" will negotiate individually concerning the quotas of natural nitrate. In the case of Italy, it is reported that an agreement permitting 60,000 tons is about to be signed. This figure is very close to the one in effect last year and hope is expressed that similar action by other countries will result in a temporary truce, at least in the present situation.

Prices Nominal

In this country, little change has taken place since last month. Imported ammonium sulfate is quoted at around $22 a ton. To date domestic producers of other forms of fertilizer nitrate have refrained from committing themselves on the coming fertilizer season's prices.

The situation in Chile, due partly to the unsettled conditions existing in the nitrate field, became more complicated when the Government informed the National City Bank in New York that it was unable to meet its obligations. The cable received in New York Aug. 20 stated in addition to giving a detailed account of the present financial status, that, "After a careful study of the financial position of the State, and taking into account the maximum economies which can be effected within the remaining five months of the present year, it is not possible during this period to effect the service of the external funded debt."

On Aug. 30 it was announced that the present Chilean government had decided to investigate the "Cosach". The investigation will be conducted by the National Tribunal.

Among the many charges brought against "Cosach", is the complaint that Chilean producing companies and other nitrate enterprises of foreign ownership were brought into the combine through "unlawful persuasion."

The measure in Chilean Congress which provided authorization for the project, also was unconstitutional, it is charged, under special powers granted to the Ibanez Administration.

The charges are similar to those that have been voiced for more than a year by the political enemies of the Ibanez regime.

E. C. Klipstein & Sons, Co., South Charleston, W. Va., has completed installation of a unit for the production of chloracetophenone for use in methanol anti-freeze, in accordance with the ruling made by the Public Health Service effective July 1.

Diamond Alkali is now producing a high quality chemical salt specially adaptable to manufacture of chemicals and dyes. Physically the material is very finely grained and analyzes over 99.9 per cent NaCl, entirely free of calcium and magnesium compounds.

Krebs Pigment & Color, jointly owned by Commercial Solvents and du Pont with its affiliated Grasselli Chemical, will have total assets of about $10,000,000. Du Pont interests will have control, but Commercial Solvents receives a stock interest considerably larger than the assets contributed by its merging subsidiary, Commercial Pigments.

Four of the sixteen corporations recently indicted by a Federal jury on charges on conspiracy to violate the dry laws filed appearance papers in the United States District Court before summons were served. These conscerns are: American Solvents & Chemical; American Solvents & Chemical Sales Corp.; U. S. Industrial Alcohol and U. S. Industrial Chemical Co.

Peerless Union Explosives, Leroy, N. Y. plant is shut down. No announcement was made as to the duration of the closing order, but as a considerable amount of machinery and equipment is being removed to other plants it is expected the plant will remain closed for months.

Brown Guano, Albany, Ga., purchased the plant of the Shepard Fertilizer Co., located just outside of the city limits and operated since 1927 by J. B. Shepard.

A. A. Corey, Jr., president, Vanadium Corp. announced a slash of from 5 to 16 ⅔% had been made in all salaries as of August 1. The amount of the cuts was distributed in various salary brackets as equitably as possible. All mines, except one small operation, were shut down in October, 1930, and the plants at Bridgeville and Niagara Falls were shut down in March 1931.

Dry Ice Corp. has made license agreement, under patents, with Delancey Chemical Corp., Philadelphia, the latter company being associated with Publicker Alcohol.

Koppers Co. and subsidiaries reduced salaries of all full time employees 10%, effective August 15. Wages of workers paid by the hour or by the day will not be affected. The cut also applies to Seaboard By-Products and other affiliated organizations.

Du Pont Ammonia is dissolved and its assets and business transferred to the parent company. The business will be conducted by a fifth industrial department of du Pont with F. A. Wardenberg, now president of the Ammonia corporation, as its general manager. National Ammonia will be continued as a separate corporation at present, but will be consolidated soon with the new ammonia department.

Company News

William Neuberg, Inc., has been granted a charter in New York to deal in chemicals. The corporation is a successor to the late William Neuberg. Under the active management of his son, William D. Neuberg, the corporation will continue to specialize in tartaric acid and tartrates.

Glidden filed in the U. S. District Court for the Eastern District of N. Y. its answer to the complaint of du Pont, alleging infringement of Flaherty and Hitt patents covering improvements in nitrocellulose lacquers. Glidden answer denies the claims of priority and scope of the patents on which the du Pont complaint is based.

American Commercial Alcohol moved August 17, to the Chrysler building, 420 Lexington Ave., N. Y. City.

Century Carbon, controlled and operated by Wishnick-Tumpeer, announce the acquisition of Union Gas Products properties at Swartz, Louisiana. These properties comprise complete gasoline absorption plant, carbon black plant and gas producing wells and acreage.

L. H. Butcher Co., San Francisco, is now exclusive Pacific Coast sales agents for both Koppers Products and White Tar. Their territory embraces the states of California, Oregon, Washington, Idaho, Utah, Nevada, Arizona and New Mexico.

Kalbfleisch is now producing a gum rosin size in dry form. This product removes the necessity of using the inconvenient liquid and mill-made gum rosin sizes.

Monsanto New York offices are now on the 12th floor of the Empire State. This building is rapidly becoming the new chemical center of New York.

Hercules has developed Hercules, a new smokeless bulk shotgun powder.

Davison Chemical had $2,186,000 worth of property owned in North Carolina attached recently. The attachment is connected with a suit for $1,500,000 against Davison, C. Wilbur Miller, its president, and the Meadows Co., and will run pending the final determination of the action. The suit was brought by purchasers of the claims and accounts in the receivership of the E. H. & J. A. Meadows Co. These assets were purchased for $35,500. The purchasers, together with two of the conditions of the former Meadows firm, allege that the defendants in the $1,500,000 action conspired to destroy the E. H. & J. A. Meadows.

American Cyanamid's first and second golf tournaments were such successes that a committee has been formed to arrange the details of the third to be held Sept. 26 at the Blue Hills Country Club at Pearl River, N. J.

A handicap committee has been selected for setting handicaps and all such handicaps set by the committee will be final.

Equipment

Newark Wire Cloth Co., Newark, has announced the appointment of F. C. Ryan, as sales manager. Mr. Ryan is a graduate of Lehigh. During the war he was connected with the Bureau of Mines and later became sales engineer with New Jersey Zinc Co. and more recently as staff manager with Johns-Manville Sales Corp.

Stedman's Foundry & Machine Wks., Aurora, Ind., has appointed the following representatives. Goggin & Mills are the Stedman representatives in Chicago; in Pittsburgh, Louis Mardaga. J. Y. Riffe, located at 811 Peoples Bank Building, will represent Stedman in Charleston, W. Va., and S. D. Calloway, in Kansas City, Mo. In Vancouver, the Stedman representatives are Brown, Fraser & Co.

The Committee of Cooperation made up of representatives of the creditors of the Douthitt Engineering Co., Chicago have reported that a substantial number have accepted the Committee's plan of reorganization.

Foster Wheeler, in Supreme Court asked for temporary injunction to restrain American Locomotive, Alco Products Corp., its subsidiary, and Amtorg from manufacturing, purchasing or selling oil refining machinery said to be made in accordance with plans allegedly stolen from the plaintiff.

Braun Corp.'s new Los Angeles building and warehouse, occupied Sept. 7

Newport Acquired

Official confirmation by DuPont of its recent acquisition of the dyestuffs and chemical business of Newport was given on Aug. 25 with the release of the following announcement.

"We desire to announce the amalgamation of the Dyestuffs and Chemical business of The Newport Company and Newport Chemical Works with the Dyestuffs Department of this Company.

Solvay's 50th Anniversary

This month marks the 50th anniversary of the incorporation of the Solvay Process Co., and the establishment in this country of an alkali industry. The original 30 ton per day soda ash plant at Syracuse, N. Y., was the beginning of one of the largest divisions of our present industrial chemical industry.

Rowland Hazard was the founder and the first president of the Solvay Process Co. Associated with him was W. B. Cogswell. It was he who first conceived the idea of negotiating with Ernest Solvay of Belgium for the establishment of an American plant and in 1880 having secured Hazard's financial backing Cogswell journeyed abroad and closed the deal. Under the financial genius of Rowland Hazard and later his son, Frederick R. Hazard, combined with the engineering and chemical ability of Cogswell the small unit was expanded many times within a very short space of time.

Pioneer in the American field, the company has been in continuous operation and is the largest manufacturer of commercial alkali in this country with plants located at Syracuse, Detroit and Hutchinson, Kansas. In addition to alkalies, the company manufactures other important industrial chemicals.

The Solvay Process Co., became one of the important units in the group comprising the Allied Chemical & Dye Corp., and in 1927 the Solvay Sales Corp., was formed to control the sale of Solvay products.

A detailed history of the development of the Solvay alkali enterprises in this country appeared in the March, 1929 issue of CHEMICAL MARKETS, page 245, "Now It Can Be Told"—Dr. L. C. Jones' Story of Solvay—As Told to Williams Haynes.

Washington

Washington was well populated with chemical company representatives in August attending the freight rate meetings reported in detail elsewhere. Aside from the interest in what relief, if any, was to be given to the carriers the industry centered its attention on the Muscle Shoals problem and Tariff Commission news.

The Commission has issued a notice of a hearing in the commission's investigation of costs of production of feldspar, to be held in Washington, September 17. The investigation is being conducted following application by the Consolidated Feldspar Corp., East Liverpool, O., which asked for a decrease in duty. The rate on crude feldspar under the 1930 tariff act is $1 per ton. The article was previously free of duty.

Another application asked for an investigation with the view of reducing the duty on crude sperm oil, filed by the Bureau of Raw Materials for the American Vegetable Oils and Fats Industries. The petition, signed by John B. Gordon, secretary of the bureau, declares that the only American producer of crude sperm oil is a subsidiary of a Canadian corporation, the Consolidated Whaling Co., which has stated it is not concerned with a duty change, and that request is made on behalf of the domestic refiners of sperm oil, the largest of which is the Cook Swan Oil Corp.

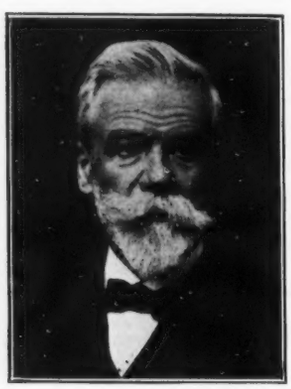
Amm. Sulfate Ruling

Seymour Lowman, assistant secretary of the Treasury has intimated that his department may consume two months before any decision is announced concerning the application of the anti-dumping provisions of the tariff act. Senator Harris, Ga., had a conference on Aug. 4 with Lowman but was unable to force the issue to a head. Harris desires immediate action in favor of the cotton and other agricultural growers in the South.

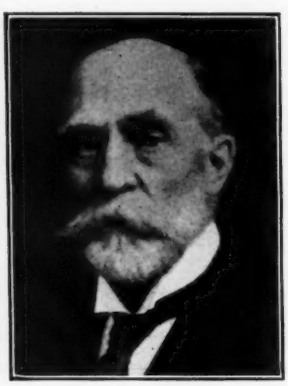
Southern Freight Rates

The Interstate Commerce Commission issued an order on Aug. 10, establishing class rates instead of old commodity rates on a large number of chemicals moving from the East to the South. The rates applied from New England and Middle Atlantic states to all points in the South and applied to all-rail and joint rail and water movements although generally used on joint-route shipments in less than carlots.

The Commission in its decision stated, "The commodity rates were established twenty-five years ago or more as an aid to the then infant cotton-textile industry in the South. They have been little altered since, except to reflect the horizontal changes which were made in all rates during the war and post-war period. The result is that the rates have become antiquated and the rate structure archaic and not justified by present conditions in industry and transportation. Although these chemicals are used in the manufacture of cotton textiles, especially in the finishing processes, nearly all of them have other important uses, and with the industrial development of the South in recent years shipments are now being made under these rates to numerous places and establishments having no connection with the cotton-textile industry. Moreover, when the rates were first established the domestic production of chemicals was relatively small and the movement under the rates consisted principally of chemicals imported through the North Atlantic ports and reshipped to the South, whereas today chemicals are produced at a number of points in the North. This has led to demands from manufacturing chemists located in Central territory for commodity rates to the South made with relation to those from Eastern trunk line territory and New England, as evidenced by the present complaint of the Victor Chemical Works at Chicago Heights. Being thus pressed with demands for extension of the commodity rates, both as to origin and destination points, and recognizing the inconsistency of according to this group of chemicals



Ernest Solvay

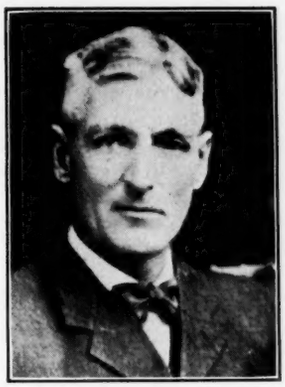


W. B. Cogswell

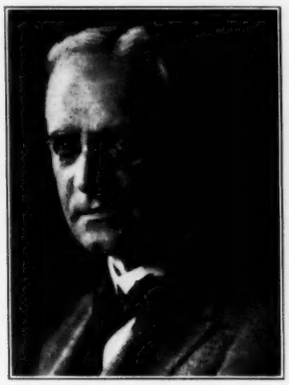
John D. Pennock

Frederick R. Hazard

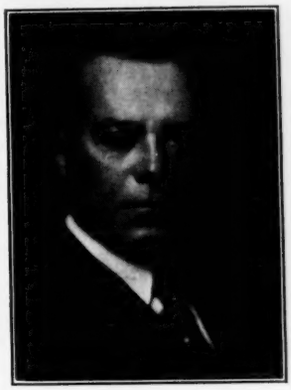
Figures who played an important role in the development of an alkali industry in America



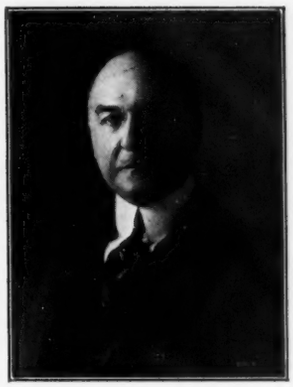
Col. William C. Proctor



George Eastman



Walter Teagle



Pierre S. du Pont

commodity rates which bear no relation to class rates while applying class rates on many more or less similar articles, respondents decided to cancel the commodity rates entirely and place this traffic on the classification basis."

The list of chemicals and changes in classification may be obtained from the Commission.

The Commission also ordered the following changes in the carlot rates from Chicago Heights, Ill, to the South: Formic acid, in carboys, fifth class. Oxalic acid, in barrels, sixth class; Soda phosphate, seventh class; Trisodium phosphate, seventh class.

Obituaries

F. M. Smith

Chemical industry lost one of its quaintest personalities in the death on Aug. 27 of F. M. Smith more intimately known as "Borax" Smith or the "Borax King."

Mr. Smith, who was 85, once possessed a fortune estimated at many millions. As he invested heavily in real estate, traction companies and Nevada mining properties, his wealth diminished, and when he died only a small portion was reported left. A year ago he auctioned off an art piece valued at $1,800,000 at his home.

Forty years ago Mr. Smith was a miner, picking at mineral pockets here and there, sleeping under the stars wherever night chanced to overtake him, oblivious to hunger.

After wandering in the arid wastes of Arizona, Mr. Smith went North into California and entered Death Valley, where it had been believed no man could live, and finally came upon traces of the borax that finally made him the "Borax King." In 1872, while prospecting for gold, his imagination first became really fired when, a few yards from the door of his camp, he saw the glistening white surface of a dried saline lake called Teel's Marsh. Convinced that the snowy substance was rich in chemical values, Mr. Smith took a specimen to an assayer in Columbus, Nev., who pronounced it the finest grade of borax he had ever seen. Within two years Smith controlled the borax market of the United States.

After several years he sold out his interests only to return again to the borax fields when most of his original fortune had been lost. At the age of 75 he rode 80 miles on horseback to purchase a borax mine.

Mr. Smith was born on Feb. 2, 1846, in Richmond, Wis. He was graduated from Milton College in 1863 and immediately left his father's farm for the West. He married twice. His second wife, the former Miss Evelyn Ellis, who had been his secretary, and their four children survive.

Clinton P. Townsend

Clinton P. Townsend, head of the patent department Union Carbide, died Aug. 15.

Mr. Townsend was born at Fulton, N. Y., July 31, 1868. In his early life the family moved to Washington, D. C. Upon graduation from the Central High School of that city he became a chemist and for some years was associated with the sugar industry in Louisiana. He later was graduated from the Corcoran Scientific school of Columbian (now George Washington) University, receiving the degree of Bachelor of Science in 1899.

From 1896 to 1902 he served the United States Patent Office as assistant examiner of the newly formed department of electrochemistry, in association with Dr. Eugene A. Byrnes, then the primary examiner in charge of the division of electro-chemistry and metallurgy. Resigning from the Patent Office in 1902, Mr. Townsend conducted independent research work in the field of electrochemistry. His studies in this field were notedly successful, including the invention of the well-known Townsend cell.

Continuing the association begun in the Patent Office, Dr. Byrnes and Mr. Townsend in 1903 joined in the practice of patent law in Washington, forming the firm of Byrnes & Townsend.

Unemployment Plans

Chemical executives will play an important part in the President's unemployment relief plan. The committee chosen to assist Mr. Gifford, American Telephone & Telegraph Co., head, includes the names of Pierre S. du Pont, Chairman of the board duPont de Nemours, George Eastman, holding similar position in Eastman Kodak; Col. William C. Proctor, Proctor & Gamble; and Walter Teagle, Standard of New Jersey.

Whatever the final plans worked out by Mr. Gifford, or by him and his advisory committee, they inevitably will follow the general policy of the Hoover Administration, that actual relief of the unemployed is primarily a local responsibility and hence will be fixed upon the various communities through the nation.

Personal

Three new members were elected at a meeting of the executive committee of the drug, chemical and allied trades section of the New York Board of Trade Thursday. They are Hazel Atlas Glass Co., L. Sonneborn Sons, Inc., A. K. Hamilton-Franco American Chemical Works.

Chemical methods of converting agricultural waste into useful products were discussed recently before the Alabama Farm Bureau Federation by Theodore Swann, president Swann Corp. Mr. Swann is a former vice-president of Alabama Industrial Development Board.

John A. Silver, advertising manager and assistant sales director, F. J. Stokes Machine Co., makers of chemical and pharmaceutical machinery, Philadelphia, sailed Aug. 21st for a six weeks' combined business and pleasure trip to England and the Continent. His itinerary includes a conference in Liverpool with Thompson an Capper, Ltd., Stokes' English representatives.

Dr. Charles L. Parsons, business manager A. C. S., has been elected honorary member of the Society of Chemical Industry, the insignia of this distinction being presented by Prince George of England at the jubilee meeting of the Society in London.

J. Wrench, sales manager, Industrial Chemical Sales, commenced a trip to the coast August 14 to visit sales offices of the

Company. On his return he proposes dropping off at Denver, Colorado and Chicago, Illinois arriving in New York the second week in September.

Muscle Shoals Bids

Considerable amusement was derived in chemical circles from the list of 136 chemical companies to whom invitations were issued to bid on Muscle Shoals by Col. Joseph I. McMullen, of the Judge Advocate General's office of the Army and a member of the President's Muscle Shoals Commission. One very prominent and specially well-informed member of the industry pointed out that if no other proof were available of the Government's inability to operate a nitrogen fixation plant the publication of such a list requesting bids would be more than sufficient to prove the incompetency of those who would place the government in the position of attempting to manufacture a product considerably over-produced and one requiring the highest type of technical knowledge and business acumen to successfully manage.

Included in the 136 names were several companies long since out of business. Seaboard Chemical Co., 90 West St., formerly a manufacturer of alcohol and absorbed into the Rossville combination; several strictly importing houses such as Superfos Co., Hosken & Co., importers of menthol; several drug manufacturing and jobbing houses, such as Lehn & Fink and Schieffelein; a large number of manufacturer's agents and jobbers of industrial chemicals such as Benner Chemical in Chicago, Welch, Holme and Clark and Parsons & Petit in New York City. Perhaps the prize out of the lot however, was Charles L. Parsons, Mills Building, Washington, D. C. This address is the editorial address of the Industrial and Engineering Chemistry, American Chemical Society publication and Parsons is the Association's secretary, recently honored in England by the Society of Chemical Industry.

Included in the list are the names: National Grange, Farmers Educational & Cooperative Union of America, and the American Farm Bureau Federation. On the list there are not more than three or four, that by any stretch of the imagination, could be classed as even remote prospects for undertaking the operation of a nitrogen producing unit. Considerable speculation was noted as to why the particular haste (bids were due Sept. 1) specially in view of the fact that Muscle Shoals is a sort of perennial flower dear to the hearts of mid-western and southern congressmen and senators and sure to be missed if ever removed from the congressional calendar. How the Government expected that between Aug. 12 and Sept. 1, twenty days, that any company could make an intelligent effort to bid for the property is a mystery to the industry.

Edward A. O'Neal, president of the American Farm Bureau Federation announced on Aug. 24 that the Bureau would make a bid for the property. He made the statement following a conference with President Hoover regarding the subject.

Mr. O'Neal said the President is anxious to have the problem of Muscle Shoals settled as speedily as possible and is sympathetic with the Federation's idea that the plan of operation must be in the interest of agriculture.

Personnel

L. M. Bent, Hercules general manager of naval stores announced several changes effective Aug. 11. J. E. Lockwood, formerly director of sales, is now assistant to the general manager. Arthur Langmeier, formerly assistant director of sales, becomes director of sales. George C. O'Brien, formerly manager of the Chicago office, is now assistant director of sales. Jesse Gibson, sales manager, assumes charge of Wilmington branch office sales. Arthur H. Sanford, formerly manager of Wilmington branch office, will do special sales work under the direction of Mr. Gibson. C. H. Boys, formerly manager of the Birmingham branch office is now manager of the Chicago district.

Arthur Langmeier

The Birmingham branch office will be discontinued as of Aug. 15, and the states of Tennessee, Georgia, Florida, Alabama, Mississippi, and Louisiana will be included in the Chicago territory under the management of C. H. Boys. The states of North Carolina and South Carolina will be included in the Wilmington sales territory under Mr. Gibson's jurisdiction.

George P. Huisking, who prior to July 1st, 1930 was for twenty years connected with Chas. L. Huisking & Co., has resumed employment with that Company. He left them last year to join the Matawan Coal Tar Corp. as sales manager but that connection did not develop as he anticipated and after a short time the arrangement was dissolved. He then started a commission agency business under his own name. This business has now been closed up and he resumed connection with his former firm as of August 10th, 1931.

W. S. Brimijoin, formerly superintendent of the Hercules Powder's explosives plant, Emporium, Pa., has joined the Safety and Service Department of the home office in Wilmington, and will assume his new duties on September 1,

Edgar S. Ross, pres., Headley Emulsified Products, Philadelphia announced the appointment of J. G. Campazzi as vice-pres., in charge of sales.

Trade Commission News

The Federal Trade Commission has agreed to several changes in the trade practice conference rules of the fertilizer industry accepted by the industry.

The commission placed in group I three rules relating to practices held to be violations of the law, namely, selling goods below cost with the intent of injuring a competitor, defamation of competitors, and secret payments of rebates.

A resolution on false invoicing was accepted by the commission as an expression of the trade and was placed in group II.

Manufacturers of solvents (esters) used in lacquers, have accepted the industry's trade practice conference rules following several changes suggested by the Federal Trade Commission and the commission's refusal to approve or accept one resolution as adopted by the industry at its conference.

The rules as accepted by the industry have been divided into two groups. Group I represents those practices deemed in violation of the anti-trust laws and Group II represents those rules accepted by the commission as expressions of the trade.

In an effort to determine the exact nature and location of the consuming markets for turpentine, the Department of Commerce at the request and with the cooperation of the Pine Institute, Inc., is soon to undertake a survey of the naval stores industry. The survey will be national in scope, taking in all important producers, distributors, and consumers of turpentine.

The Industrial Marketing Section of the Bureau, which will make the survey, will have the assistance of the Bureau's Chemical Division. The Pine Institute, Inc., is cooperating with the Department in perfecting a questionnaire to be sent to all known handlers of turpentine throughout the country.

Dr. Firman E. Bear, director of agricultural research, American Cyanamid, recently returned from a visit to Europe where he made a study of the fertilizer situation, with particular reference to nitrogen, in England, Holland, Belgium, Poland, Czechoslovakia, Germany, Italy and France.

Russell R. Brown announces the removal of his office to the Chrysler Building in N. Y. City.

The Financial Markets

Stocks Move Slightly Higher—Oil Group Recovers—A. A. C. Bonds Redeemed—Cyanamid Reports for Year.

The August stock market was a very quiet affair. Generally speaking, stocks recovered moderately from the low levels reached in July, but price movements and actual transactions reflected the

Daily Record of Stock Market Trend

—*N. Y. Herald Tribune*

present state of mind of the public waiting for definite signs before making further commitments.

The week ending August 7 saw prices slightly lower, the week ending August 14 saw a decidedly improved tone; the week ending August 21, witnessed further declines, while the last week found the market so dull that movements in either direction were quite impossible.

The foreign situation became worse and then slightly better during the month. Germany apparently was passing through a critical stage in a very satisfactory manner, climbing out of the depths principally by its own efforts. In England, an acute financial crisis forced the Labor Government out and a coalition in under the leadership, however, of MacDonald. The dole, apparently, has at last brought England into a state bordering on receivership. With the announcement of the formation of the coalition ministry and the loan of five hundred million dollars credit, the situation became less tense and the market revived slightly.

The market was also showing signs of nervousness due to several proposals put forth in this country including the possibility of dole agitation when Congress meets in December together with the absence of reassuring news on the state of business.

In the chemical group practically all stocks showed some recovery from July. In the representative group listed below all with the exception of duPont gained, while this stock showed only a fractional decline. Compared with the losses in July, however, the recovery was of very modest proportions in most stocks. The gains compared with the July losses as follows:

	August	*July*
Allied Chemical	+5½	—25½
Air Reduction	+5	—12¼
Anaconda	....	— 5½
Columbian Carbon	+ ⅜	—14⅜
Com. Solvents	+ ⅞	+ 1⅛
du Pont	— ¾	— 5
Standard N. J.	+3½	— 2¼
Texas Gulf	+2½	— 4⅜
U. S. I.	+6⅜	— 5⅜

Values Rise

With the range of movement narrowed down perceptibly, the change in total values on the Exchange between July 31 and August 31 was much less than the change recorded the month previously. The 240 issues compiled by the NEW YORK TIMES rose in value $63,714,299 against a loss of $1,821,603,509 in July.

The extent of the losses in chemical, oil and copper stocks since the end of September, 1929 are shown in the following table. It is readily seen that only the public utilities and railroads exceed these three groups. In considering the importance of these figures it must be borne in mind that the loss for the chemical group represents the losses for only nine companies against 29 in the public utilities group and 25 in the railroad group.

Group and No. of Issues	*Depreciation*
Amusements (5)	$511,240,645
Building (9)	696,262,673
Business equipment (4)	613,297,481
Chain stores (14)	679,163,968
Chemicals (9)	2,513,746,215
Coppers (15)	2,673,597,016
Department stores (10)	275,325,139
Foods (10)	1,308,929,185
Leathers (4)	7,718,868
Mail order (3)	934,704,175
Motors (15)	2,273,963,345
Motor equipment (7)	148,125,750
Oils (22)	3,242,325,964
Public utilities (29)	6,834,713,054
Railroads (25)	4,574,088,976
Railroad equipment (8)	526,824,340
Rubber (6)	227,029,426
Steels (13)	1,844,156,753
Sugars (9)	93,996,748
Tobaccos (14)	165,213,645
Total	$30,144,423,366

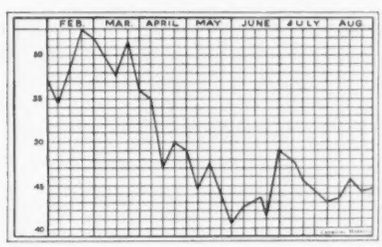
Chemical Stock Values

The net gain in value for nine representative industrial chemical stocks for August amounted to $21,206,011 made up as follows:

	Increase	*Decrease*
Allied Chemical	$11,406,118	.....
Commercial Solvents	1,581,272	.....
Davison Chemical	.....	.....
Du Pont	.....	$16,598,491
Mathieson	650,396	.....
Texas Gulf	5,080,800	.....
Union Carbide	17,290,129	.....
U. S.	1,915,950	.....
Virginia-Carolina	.....	120,163
Total	$37,924,665	$16,718,654

Average Price Trend

Chemical Markets Average Price for 15 representative chemicals showed a net gain in August. The Price stood as follows



on each Friday of the month: Aug. 7, 43.03; Aug. 13, 45.83; Aug. 20, 44.20; Aug. 27, 44.60. This compares favorably with 43.01 on July 30.

Oil Group Revives

The long-abandoned oil group received the greatest attention scoring an appreciation of $255,805,564, following a loss of $106,665,320 in the twenty stocks in July. Restriction of oil production and the movement to consolidate several units in the industry created favorable sentiment toward the group. August, 1930 was also a month of recovery in stock values. The enhancement in chemical stocks a year ago however, was considerably larger, amounting to $113,914,707 against only

Price Trend of Chemical Company Stocks

Name	*July 31*	*Aug. 7*	*Aug. 14*	*Aug. 21*	*Aug. 28*	*Net Change*
Allied Chem	106½	108¾	117¼	112	112	+5½
Air Red	74	76¼	82¼	76	79	+5
Anaconda	24⅞	24⅜	25¼	24⅛	24⅞	.....
Columbian Carbon	66⅞	69⅞	74	70	67	+ ⅜
Comm. Solvents	16⅜	16⅜	18⅛	17	17⅛	+ ⅝
Du Pont	87	84	89⅝	84⅜	86¼	— ¾
Standard of N. J.	37¼	37⅛	40	40	40¾	+3½
Texas Gulf	33⅛	34	35	34⅛	35⅝	+2½
U. S. I.	27⅞	28	30	31⅞	34½	+6⅝

TOMORROW
LIES IN THE TEST TUBE

IN 1921 an event took place, unknown except to a small number of men. Yet the whole world now enjoys a variety of better food products because the clean white heat of the electric furnace was applied to the problem of making pure phosphoric acid.*

Today, a series of such events is in the making. And no man can tell where their influence will end. For whenever a new chemical is made commercially available—civilization takes a great stride forward.

Your chemists will tell you that, given chemicals with certain properties, they can make your product far better. But, they will also tell you,—such chemicals are often rare and costly. And the added cost overbalances the improvement that would result —bars you from the change.

So Swann Research, set up to achieve these essential ingredients, to bring them into the reach of Industry, to make them available to the chemists of the world, is opening up the doors of Tomorrow, and helping you advance the progress of civilization.

* * * *

If your industrial development is impeded for lack of an essential ingredient, turn to Swann as have many of the leaders of American Industry. Our chemists will gladly discuss with you the possibility of solving the problem.

*Swann Electrothermal Acid

THE SWANN CORPORATION
BIRMINGHAM
NEW YORK ST. LOUIS
CINCINNATI

Divisions of THE SWANN CORPORATION

SWANN RESEARCH, INC., Birmingham
SWANN CHEMICAL COMPANY, Birmingham and New York
THE ILIFF-BRUFF CHEMICAL CO., Hoopeston, Ill.
FEDERAL ABRASIVES CO., Birmingham
PROVIDENT CHEMICAL WORKS, Saint Louis
WILCKES, MARTIN, WILCKES COMPANY, New York and Camden

$21,206,011 for 1931. The gain made in value of chemical stocks in 1930 was by far the largest for any of the groups while in August of this year chemicals stood fifth with oils far in the lead.

2nd Quarter Earnings

A glance through financial reports in which comparison is made in earnings in the first and second quarters is somewhat encouraging. Of four such companies, two, Monsanto and Newport made more money in the second quarter, one, New Jersey Zinc, equaled its earnings in the first quarter while the fourth, Columbian Carbon's net income dropped almost in half. The figures are as follows:

	1st Quarter a Share	*2nd Quarter a Share*
Columbian Carbon	$1.04	.55
Monsanto	.59	.97
Newport	.41	.42
New Jersey Zinc	.44	.44

For comparison of six months' earnings of 1931 with 1930 see "Earnings at a Glance" page 298.

A. A. C. Bonds

American Agricultural Chemical has announced that all of the company's funded debt has been eliminated through the redemption of bonds. Thus the item of $566,556 for bond interest in recent report will not be recurrent, although there will be come interest charge for bank borrowings during the seasonal periods between the building up of inventories and collecting the proceeds of sold merchandise.

This leaves the company without any funded debt or other senior securities, and the common stock is now the only outstanding capital obligation.

Exchange Listings

New York Stock Exchange has admitted the following securities on notice of issuance.

E. I. du Pont de Nemours & Co., 103,500 additional shares of 6% non-voting debenture stock ($100 par value).

Seaboard Oil Co. of Delaware, (change of name from Mexican Seaboard Oil Co.) 1,276,843 shares of stock without nominal or par value.

Westvaco Chlorine Products Corp., 59,807 additional shares of common stock without par value.

Vanadium definitive debentures are now ready in exchange for the temporary 10-year 5% convertible sinking fund gold debentures, due April 1, 1941, and will be obtainable on surrender of the temporary debentures at the office of Lee, Higginson & Co., N. Y., or of the Lee Higginson Trust Co., Boston.

Over the Counter Prices*

	Bid	Asked
Am. Hard Rubber	...	24
J. T. Baker Chem.	10	14
Dixon Crucible	110	125
Dry-Ice	20	30
Merck pf	20	30
Merck pf	76	74
Solid Carbonic	7½	9½
Tubize B	36	42
Worcester Salt	86	92

*Aug. 31
†Dividend.

Dividends and Dates

	Div.	*Stock of Record*	*Payable*
Abbott Lab.	.62½	Sept. 18	Oct. 1
Allied Chem. pf.	$1.75	Sept. 11	Oct. 1
Atlas Powder	$1.00	Aug. 31	Sept. 10
Carman Class A	.50	Aug. 15	Sept. 1
Com. Solvents	.25	Sept. 10	Sept. 30
du Pont	$1.00	Aug. 27	Sept. 15
du Pont deb	$1.50	Oct. 10	Oct. 24
Eastman Kodak	$1.25	Sept. 3	Oct. 1
Eastman Kod ext	.75	Sept. 3	Oct. 1
Freeport Texas	.75	Aug. 15	Sept. 1
Hercules	.75	Sept. 14	Sept. 25
Int. Nickel	.10	Aug. 31	Sept. 30
Mathieson	.50	Sept. 11	Oct. 1
Mathieson pf	$1.75	Sept. 11	Oct. 1
Monsanto	.31¼	Sept. 10	Oct. 1
Texas Gulf	.75	Sept. 1	Sept. 15
Union Carbide	.65	Sept. 2	Oct. 1
United Chem. pf	.75	Aug. 16	Sept. 1
Va-Car pf	$1.75	Aug. 17	Sept. 1
Westvaco	.50	Aug. 10	Sept. 1

Cyanamid 5% Analyzed

In a recent analysis of Cyanamid 5% Debentures by the Wall St. Journal the present price of around 86, (Aug. 25) yields approximately 6.8% to maturity and, moreover, are given an aggregate market valuation of $3,903,540, or a discount of 24% below actual cash the company had on hand and in banks as of June 30, last, amounting to $5,149,715. Total current assets on that date were $19,040,953, and after deduction of $2,765,959 current liabilities, there remained $16,274,994 working capital, or four times market value of the debentures. A year previous, net current assets of $18,095,750 were three times total par funded debt of $5,982,300.

In addition to the debentures, there are three first mortgage issues of subsidiaries outstanding, making aggregate par funded debt $5,866,800, still only approximately $700,000 in excess of cash and covered 2.7 times by working capital. These subsidiary obligations comprise $689,000 Amalgamated Phosphate Co. first 6s of 1936; $399,000 Kalbfleisch Corp. first and refunding 7s of 1936; and Selden Co. first 6s of 1938, totaling $239,800. The following table compares earnings available for interest in each of the past five years ended June 30:

	Available	*Interest*	*Times earned*
1931	$999,159	$363,789	2.7
1930	*5,327,091	438,216	12.1
1929	2,545,905	†.....	...
1928	2,078,617	294,905	7.0
1927	1,573,353	117,577	13.3

*Including operating results. for full year of companies acquired during the fiscal year. †Not reported separately.

Funds to carry out the various acquisitions were derived primarily from the sale of additional common stock to shareholders during 1929 and 1930, a total of $39,000,000 having been raised thusly, involving issuance of 1,546,338 shares. Proceeds of the debenture 5s sold in 1927, were applied toward this end also, making $44,000,000 new capital put into the enterprise in the past few years. Assets on June 30, last, aggregated $48,595,107, of which mine properties, plants and equipment comprised $22,713,608; as of June 30, 1927, total assets were $23,537,309 of which investment in plant, property and equipment at cost comprised $8,975,898. There thus has been built up a substantial background for the debentures.

Offered in amount of $5,000,000, sinking fund, calculated to retire $144,000 principal amount of the debentures each year beginning with April 1, 1929, at not exceeding par, has reduced outstanding amount to $4,539,000. Sinking fund will retire more than 40% of the issue by 1942. The bonds are a direct obligation of the company, but not secured by mortgage. It is provided, however, that the company will not create any lien without securing the 5s equally, except for purchase money mortgages and liens and pledges in the ordinary course of business maturing in not more than a year. The bonds touched a record high of 100½ in March, last year, their present level of 86 being 2¼ points above the record low of 83¾ reached in June this year.

A Decimal Point

We apologize. A decimal point is often the difference between poverty and riches. In table III of F. A. Hessel's article, "What Are Chemical Securities Worth ?" appearing on page 156 of the August issue in column 2, Senior Securities per share of common stock as of Dec. 31, 1930, the figure for Union Carbide should have read $1.829 instead of $18.29.

By Carlisle, in the Des Moines *Register*

"WHAT a bill we'll get if he tows us in."

New Highs and Lows

The number after the name designates the number of times new highs or lows were registered during the month.

High

Am. Zn. pf
Cert-td pr pf. 2
Du Pont 6% db. 2
Glidden pf
Monsanto. 2
Newport A. 2
Vulcan Det. pf

Lows

Am. Ch. pf. ww. 3
Am. Solv. & Chem. 2
Westvaco
U. S. Smelt. pf. 2
Va.-Car. C 7 pf. 3

Company Reports

Cyanamid Year Net $548,669

American Cyanamid and subsidiaries for 12 months ended June 30, 1931, shows consolidated net profit of $548,669 after depreciation. depletion, interest, federal taxes, minority interest, etc., equivalent to 22 cents a share on combined 2,470,159 no-par shares of Class A and B common stock outstanding at end of period, including shares reserved for stocks not yet presented for exhange. This compares with $4,618,099, or $1.86 a share on combined shares in the 12 months ended June 30, 1930, after preferred dividends paid.

Company has changed its fiscal year to end December 31 so that the next report to be issued will be for the 18 months ended December 31, 1931.

Consolidated income account for 12 months ended June 30, 1931, compares as follows:

	1931	1930
Operating profit	$2,969,325	$7,513,517
Divs., int. and discounts	376,861	719,642
Royalties, licenses, etc	265,502	355,341
Other income (net)	182,233	254,633
Total income	$3,793,921	$8,843,133
Depreciation and depletion	1,529,512	2,636,327
Research, process and mark dev. exp	1,265,250	879,715
Interest	363,790	438,216
Federal taxes	1,293	185,135
Minority interest	85,407	85,641
Net profit	$548,669	$4,618,099
Preferred dividends	.....	3,141
Common dividends	.....	3,569,527
Surplus	$548,669	$1,045,431

Consolidated sheet as of June 30, 1931, compares as follows:

	1931	1930
Assets		
Plt. prop. & eq	‡$22,713,608	‡$42,534,672
Cash	5,149,716	2,532,553
Notes & accts. rec., etc	4,091,303	4,916,829
Mark secur	458,372	3,271,895
Inventories	9,341,562	12,252,505
Other invest. & adv	1,191,639	1,620,645
Patents & processes, etc	5,000,000	§17,130,152
Def. chags., dev. wk. in prog., etc	648,906	3,047,715
Goodwill	1	1
Total	$48,595,107	$87,306,966
Liabilities		
Class A & B stocks	*$24,701,590	$53,460,350
Funded debt	5,866,800	5,982,300
Pfd. stock called for redempt	4,000	6,000
†Notes pay., etc	218,073	387,379
Accts. pay. & accrd liab	2,525,896	3,371,121
Dividends pay	.....	988,095
Federal tax res	21,991	131,436
Contingent res., etc	3,102,119	996,110
Sub. mint int	1,541,019	1,538,149
Earned surplus	3,363,214	3,200,744
Paid-in and cap surp	7,250,405	17,245,282
Total	$48,595,107	$87,306,966

*Represented by 65,943 shares of no-par Class A and 2,404,216 shares of no-par Class B stocks, including shares reserved for stocks not yet exchanged, but excluding 207,883 shares of B stock held by a subsidiary company. †Includes purchase money obligations. ‡After depletion and depreciation. §Includes purchased goodwill and is after depreciation.

Certain-teed Lowers Net Loss

Certain-teed Products and subsidiaries report for six months ended June 30, 1931, net loss of $200,624 after depreciation, depletion, interest, federal taxes, etc., comparing with net loss of $756,938 in first half of previous year.

For quarter ended June 30, 1931, net profit was $33,268 after charges and taxes equal to 53 cents a share on 63,004 shares of 7% preferred stock on which there is an accumulation of unpaid dividends. This compares with net loss of $233,892 in preceding quarter and net loss of $206,374 in June quarter of 1930.

Consolidated income account for six months ended June 30, 1931, compares as follows:

	1931	1930	1929	1928
Gr pr aft depr & depl	$1,717,940	$1,683,171	$1,943,201	$2,251,956
Other inc	53,197	51,923	16,046	70,717
Total income	$1,771,137	$1,915,094	$1,959,247	$2,322,673
Cost, exp & book int	1,608,698	2,301,632	2,332,544	2,050,510
Bond int	341,308	355,265	374,558	220,770
Fed tax	8,575	11,706	22,200	13,330
Sundry adj	†13,180	3,429	†4,577	†2,504
Net loss	$200,624	$756,938	$665,478	*$40,567

*Net profit. †Credit.

United Carbon Reports Loss

United Carbon Co. and subsidiaries report for six months ended June 30, 1931, net loss of $34,289 after depreciation and depletion. In first half of 1930, company reported net profit of $468,229 after charges and federal taxes, equivalent under the participating provisions of the shares, to $3.92 a share on 19,694 shares of participating preferred stock and 98 cents a share on 397,885 no-par shares of common stock.

Six Months Ended June 30—	1931	1930	1929
Operating prof. after deducting manufacturing, selling, general and administrative expenses	$324,859	$1,186,639	$1,648,971
Other income	43,240	171,206	166,889
Total income	$368,099	$1,357,845	$1,815,860
Depreciation and depletion	402,387	764,616	768,530
Bond interest and discount	.....	.....	46,039
Provision for contingencies	.....	70,000	42,500
Provision for Federal income tax	.....	55,000	120,000
Net profit	loss $34,288	$468,229	$838,791
Balance, Jan. 1	1,551,406	1,791,141	1,349,305
Sundry adjustments for prior years	Dr. 6,280	.....	11,178
Total surplus	$1,510,837	$2,259,371	$2,199,273
Dividends on preferred stock	.....	70,988	187,708
Common dividends	.....	397,885	.....
Premium on pref. stock bought and other charges	.....	105,751	.....
Balance	$1,510,837	$1,684,746	$2,011,565
Shares common stock outst.(no par)	397,885	397,885	237,661
Earnings per share	Nil	$0.99	$1.85

Clorox Chemical for year ended June 30, 1931, shows net income of $258,009 after depreciation and federal taxes, equivalent to $2.18 a share on combined 118,156 no-par shares of Class A and Class B stocks. This compares with net income in preceding fiscal year of $380,356, equal to $3.27 a share on combined 116,076 shares of Class A and Class B stock.

Earnings at a Glance

Company	Annual Dividends	Net Income 1931	Net Income 1930	Common Share Earnings 1931	Common Share Earnings 1930
Amer. Agr. Chem: Year, June 30	f...	†$782,172	.....	...	...
Amer. Cyanamid: 12 mos. June 30	f...	$548,669	$4,618,099	c$.22	c$1.86
Amer. Sol. & Chem: 6 mon., June 30	f...	†497,953	.....	...	...
Amer. Zinc, Lead & Smelting: June 30 quarter	f...	$152,466	$124,540	p$1.90	p$1.55
6 mos., June 30	f...	256,030	253,179	p3.19	p3.15
Certain-Teed Prod.: June 30 quarter	f...	33,268	†206,374	p.53	...
6 mos., June 30	f...	†200,624	†756,938	...	...
Consol. Chem. Ind.: June 30, quarter	a1.50	122,449	186,191	c.43	c.66
6 mos., June 30	a1.50	238,544	313,341	c.84	c1.12
Eagle Picher Lead: 6 mos., June 30	f...	†316,002	†836,412	...	...
General Asphalt: 6 mos., June 30	3.00	†170,660	206,680	...	.50
InternationalNickel: June 30, quarter	.40	1,700,249	3,267,730	h.08	h.20
6 mos., June 30	.40	3,359,886	7,883,874	h.16	h.50
MacAndrews & Forbes: June 30, quarter	2.00	212,569	252,395	.54	.65
6 mos., June 30	2.00	430,396	508,158	1.10	1.31
McKesson & Robbins: 6 mos., June 30	1.00	1,300,380	1,409,116	.51	.61
Monsanto Chemical: June 30, quarter	1.25	416,076	329,227	.97	.80
6 mos., June 30	1.25	671,454	622,397	1.56	1.51
National Oil Prod.: 6 mos., June 30	‡2.00	165,565	132,051	4.98	3.83
New Jersey Zinc: June 30, quarter	2.00	865,252	1,417,288	.44	.72
6 mos., June 30	2.00	1,726,021	3,089,155	.88	1.57
St. Joseph Lead: 6 mos., June 30	1.00	8,674	3,366,369	...	1.72
United Carbon: June 30, quarter	f...	†56,546	204,929	...	.43
6 mos., June 30	...	†34,289	468,229	...	.98
Vanadium Corp.: 6 mos., June 30	f...	†129,836	1,250,237	...	3.30
Virginia-Carolina Chemical: Year, June 30	f...	†369,606	1,407,003	...	2.63

†Net loss. fNo common dividend. aOn class A shares. cOn combined Class A and B shares. pOn preferred stock. ‡Plus-extras.

Newport Earns 83¢ on Common

Newport and subsidiaries for six months ended June 30, 1931, shows net profit of $483,471 after depreciation, federal taxes, etc., equivalent after dividend requirements on $3 class A stock, to 83 cents a share on 521,220 shares of no-par common stock outstanding at end of the period. This compares with $690,836 or $1.26 a share on 507,920 common shares in first half of previous year.

Net profit for quarter ended June 30, 1931, amounted to $242,540 after charges and taxes, equal to 42 cents a share on 521,220 common shares comparing with $240,931 or 41 cents a share on 521,220 common shares in preceding quarter and $264,819 or 47 cents a share on 507,920 common shares in June quarter of 1930.

Consolidated income account for six months ended June 30, 1931, compares as follows:

	1931	*1930*	*1929*
Net sales	$4,606,834	$5,063,101	$5,217,428
Costs & exp	3,726,253	3,988,499	4,183,163
Oper profit	$880,581	$1,074,602	$1,034,265
Other income	.....	11,417	64,436
Total income	$880,581	$1,086,019	$1,098,701
Depreciation	334,131	306,541	266,084
Miscel chgs	7,679	.....	.....
Federal taxes	55,300	88,642	101,000
Net profit	$483,471	$690,836	$731,617

Monsanto's Net Up

Monsanto Chemical and subsidiaries report for quarter ended June 30, 1931, net profit of $416,076 after charges and federal taxes, equivalent to 97 cents a share on 429,000 no-par shares of stock. This compares with $255,378 or 59 cents a share on 429,000 shares in preceding quarter and $329,227 or 80 cents a share on 410,307 shares in June quarter of 1930.

For six months ended June 30, 1931, net profit was $671,454 after charges and taxes, equal to $1.56 a share on 429,000 shares comparing with $622,397 or $1.51 a share on 410,307 shares in first half of previous year.

Consolidated income account for six months ended June 30, 1931, compares as follows:

	1931	*1930*
Gross profit	$2,233,168	$2,078,443
Expenses	690,578	719,813
Balance	$1,542,590	$1,358,630
Depreciation, etc	504,396	439,780
Research and develop. exp	252,728	214,351
Oper. profit	$785,466	$704,499
Other income	83,916	79,691
Total income	$869,382	$784,190
Other deductions	99,977	68,377
Federal taxes	97,951	93,414
Net Profit	$671,454	$622,399

Columbian Carbon and subsidiaries report for quarter ended June 30, 1931, net income of $299,231 after depreciation, depletion, federal taxes and minority interests, equivalent to 55 cents a share on 537,745 shares of no-par stock. This compares with $560,501, or $1.04 a share on 536,395 shares in preceding quarter and $783,175, or $1.57 a share on 498,505 shares in June quarter of 1930.

Net income for six months ended June 30, 1931, totaled $859,732 after charges and taxes, equal to $1.60 a share on 537,745 shares comparing with $1,593,180, or $3.19 a share on 498,505 shares in first half of previous year.

Consolidated income account for quarter ended June 30, 1931, compares as follows:

	1931	*1930*	*1929*	*1928*
Net aft fed tax	$650,168	$1,237,187	$1,656,391	$1,039,683
Dep and depl	390,716	381,409	546,857	354,725
Applic min int	39,979	72,603	83,902	25,639
Net income	$299,231	$783,175	$1,025,632	$659,319

Six months ended June 30:

	1931	*1930*	*1929*	*1928*
Net af fed tax	$1,616,018	$2,492,163	$3,254,760	$2,071,021
Dep and depl	799,368	771,447	1,013,422	715,228
Applic min int	*43,082	127,536	155,748	25,639
Net income	$859,732	$1,593,180	$2,085,590	$1,330,154

*Credit.

Va-Car Report Unfavorable

Report of Virginia-Carolina Chemical Corp. and subsidiaries for year ended June 30, 1931, shows net loss of $369,606 after depreciation, depletion, provision for doubtful accounts and taxes. This compares with net profit in preceding fiscal year of $1,407,003, equal after 7% prior preference dividends, to $2.63 a share on 213,392 shares of 6% participating preferred stock.

Dividends unpaid on the 6% participating preferred stock amounted to 19% on June 30, 1931.

Years End. June 30—	*1931*	*1930*	*1929*	*1928*
*Gross earnings	$1,979,657	$3,925,182	$3,925,540	$4,848,143
Int. on bank bal. & call loans and divs. on investment, &c	440,903	696,290	629,988	552,150
Total income	$2,420,560	$4,621,472	$4,555,529	$5,400,293
†Sell., admin. & gen exp	2,196,265	2,283,269	2,130,431	2,127,041
Net earnings	$224,294	$2,338,203	$2,425,097	$3,273,252
Depreciation	563,901	831,200	809,596	762,549
Prov. for Fed. inc. taxes	30,000	100,000	100,000	.....
Net earnings def	$369,606	$1,407,003	$1,515,501	$2,510,702
Divs. on prior pref	798,000	844,725	863,450	896,199
Divs. on particip. pref	.....	426,112	639,168	.....
Balance, surplus def	$1,167,606	$1,136,166	$12,884	$1,614,503
Earns. per sh. on 486,700 shs. com. stk. (no par)	Nil	Nil	Nil	$0.68

*After deducting manufacturing costs and expenses, including ordinary repairs and maintenance of property, depletion of mines, but before providing for depreciation. †Including provision for doubtful accounts and bills receivable and cash discounts.—V. 132, p. 2410.

New Jersey Zinc reports for quarter ended June 30, 1931, net profit of $865,252 after depreciation, depletion, taxes, contingencies, etc., equivalent to 44 cents a share (par $25) on 1,963,264 shares of stock. This compares with $860,769 or 44 cents a share in preceding quarter and $1,417,288 or 72 cents a share in June quarter of previous year.

Net profit for six months ended June 30, 1931, amounted to $1,726,021 after charges and taxes, equal to 88 cents a share on common comparing with $3,089,155 or 1.57 a share in first half of 1930.

Income account for quarter ended June 30, 1931, compares as follows:

	1931	*1930*	*1929*	*1928*
*Net prof	$865,252	$1,417,288	$2,477,806	$1,812,431
Dividends	981,632	981,632	981,632	981,632
Deficit	$116,380	†$435,656	†$1,466,174	†$830,799

Six months ended June 30:

	1931	*1930*	*1929*	*1928*
*Net prof	$1,726,021	$3,089,155	$4,474,741	$3,461,459
Dividends	1,963,264	2,944,896	3,926,528	2,944,896
Deficit	$237,243	†$144,259	†$548,213	†$516,563

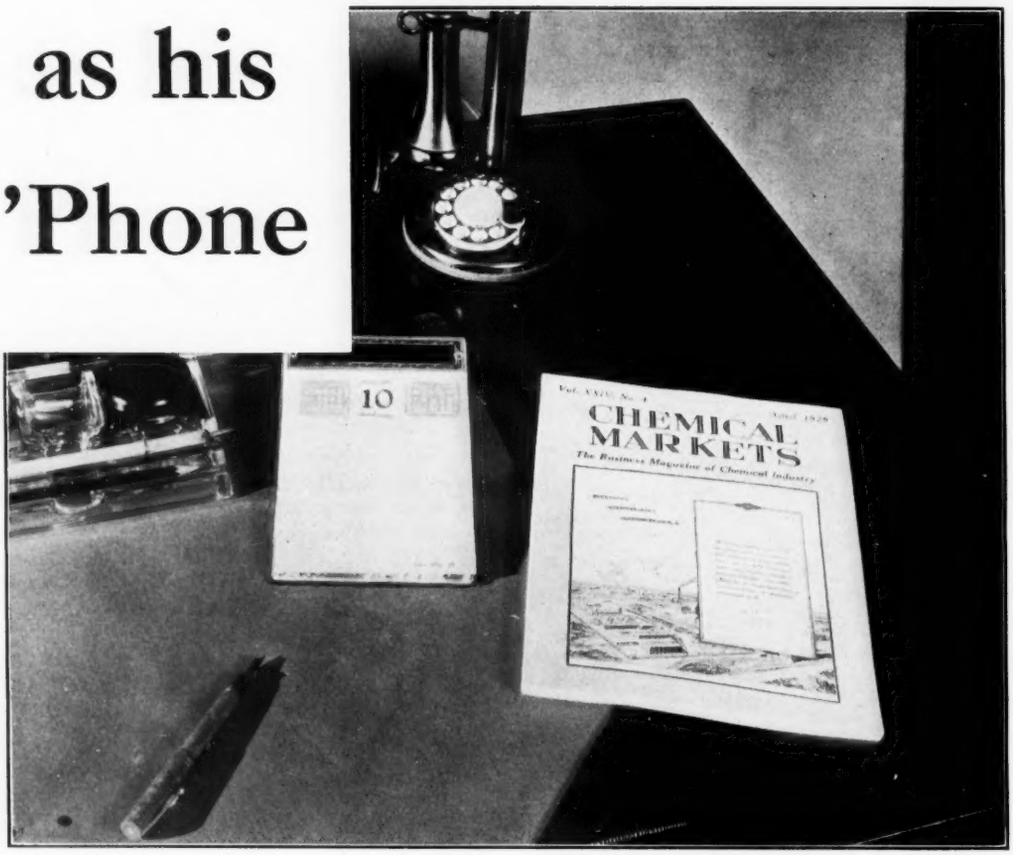
*Includes dividends received from subsidiaries and after taxes, depreciation, depletion, contingencies, etc. †Surplus.

International Printing Ink reports for six months ended June 30, 1931, net profit of $163,631 after charges, federal taxes and reserve for exchange fluctuations, equal to $2.42 a share on 67,413 shares of 6% preferred stock. This compares with $126,886 or $1.85 a share on 68,457 shares of preferred stock in first six months of 1930.

Vulcan Detinning reports for quarter ended June 30, 1931, net income of $72,434 after depreciation, taxes, etc., equivalent after dividend requirements on 17,996 shares of 7% preferred stock outstanding at end of quarter, to $1.27 a share on 32,258 shares of common stock. This compares with net income in preceding quarter of $79,264 equal after dividend requirements on 19,700 shares of preferred stock, to $1.38 a common share, and net income of $75,768 or $1.22 a common share in second quarter of 1930, after dividend requirements on 20,778 preferred shares.

American Solvents & Chemical and subsidiaries report for six months ended June 30, 1931, net loss of $497,953 after depreciation, interest and other charges. On account of consolidation of the various companies on June 30, 1930, no comparable figures are available for the same period of last year.

Indispensable as his 'Phone



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United Chemicals Earnings Less

United Chemicals for six months ended June 30, 1931, shows surplus available for common stock of $20,108 after charges, federal taxes and preferred dividends, equal to 20 cents a share on 102,000 no-par shares of common stock. This compares with $108,573 or $1.06 a share in first half of previous year.

Current assets as of June 30, 1931, amounted to $3,181,478 and current liabilities $407,472 comparing with $4,144,622 and $247,385 respectively on June 30, 1930.

6 Months Ended June 30—	*1931*	*1930*	*1929*
Profit after charges & Fed. taxes	$20,108	$108,573	$205,271
Earns. per sh. on 102,000 shs. com. stock (no-par)	$0.20	$1.06	$2.01

St. Joe Reports $8,674 Profit

St. Joseph Lead and subsidiaries for six months ended June 30, 1931, shows profit of $8,674 after depreciation, taxes and minority interests, equivalent to less than 1 cent a share (par $10) on 1,950,460 shares of capital stock comparing with $3,366,369, or $1.72 a share in first half of 1930. After depletion, net loss for the six months was $983,670, against net profit in first half of 1930 of $2,025,825, equal to $1.04 a share.

Consolidated income account for six months ended June 30, 1931, compares as follows:

	1931	*1930*
*Profit from operations	$638,112	$3,264,782
Other Income	114,592	1,131,584
Total income	$752,704	$4,396,366
Depreciation	632,150	717,977
Federal taxes	.....	287,339
Other deduct	116,121	.....
Minority interests	‡4,241	$24,681
Profit	$8,674	$3,366,369
Depletion	§992,344	1,340,544
Net loss	§983,670	†$2,025,825

*After expenses, including writing off of development and exploration charges. †Profit. ‡Credit. §Debit.

American Agricultural Chemical (Delaware) and subsidiary companies for fiscal year ended June 30, 1931, including the business of the Connecticut company up to the time it was taken over, shows net loss of $782,172 after depreciation, depletion, reserves for doubtful receivables, interest, etc. This is first annual report since company took over the business of its predecessor company, in accordance with the plan of capital readjustment.

Consolidated income account for year ended June 30, 1931, follows: Operating profit, $972,050; depreciation and depletion, $684,921; reserves for doubtful receivables, $502,746; interest, $566,555; net loss, $782,172.

Consolidated balance sheet as of June 30, 1931, follows:

Assets: Land, buildings, machinery and equipment, after reserves, $5,280,877; phosphate rock deposits, after reserves, $1,738,313; properties not required for operating purposes, after reserves, $1,166,257; purchase money obligations and sundry investments, $1,313,950; goodwill, brands and trademarks, $1; cash, $5,978,698; accounts and notes receivable, $8,097,240; inventories, $5,770,996; sinking fund for redemption of mortgage bonds and trust funds, $947; deferred charges, $369,763; total, $29,717,042.

Liabilities: Capital stock, represented by 317,875 shares issued or issuable, including shares reserved for capital stock of predecessor company not yet exchanged, $12,715,000; funded debt (called for redemption August 1, 1931), $5,365,500; accounts payable and accrued liabilities, $560,837; accrued interest, interest, $172,985; deferred credits, $94,850; reserve for contingencies, $2,280,760; reserve for federal taxes, $84,363; capital surplus, $7,744,349; earned surplus, $698,398; total, $29,717,042.

Shell Union Oil and subsidiaries report for quarter ended June 30, 1931, net loss of $11,056,034 after interest, depreciation, depletion, etc., comparing with net loss of $9,903,472 in preceding quarter and profit of $2,874,031 before federal taxes in June quarter of previous year.

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The Industry's Stocks

NEW YORK STOCK EXCHANGE

1931 August High	1931 August Low	1931 August Last	1931 High	1931 Low	1930 High	1930 Low	Sales In August	Sales During 1931	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1930	Earnings $-per share-$ 1929
83¾	74½	77	109¾	70¾	156¾	87½	42,800	1,108,400	Air Reduction	No	830,000	$3.00	6.32	7.75
119	105¼	111¼	182¾	102¾	343	170½	142,200	1,878,085	Allied Chem. & Dye	No	2,401,000	6.00	9.77	12.60
123¾	122¼	122¾	133¼	120¾	126½	120¾	800	10,100	7% cum. pfd.	100	393,000	7.00		76.88
14¼	12¼	12⅝	29⅛	11⅛	10⅜	1⅛	2,600	48,700	Amer. Agric. Chem.	100	333,000		Yr. Je. '30 Nil	
9¼	6¼	8⅜	14½	5¼	33	9	27,300	181,600	Amer. Com. Alc.	No	389,000		d1.27	3.22
12	10	11	23¾	8¼	51½	7	4,600	90,900	Amer. Metal Co., Ltd.	No	1,218,000	1.00	1.63	3.23
58¼	51	51	89½	51	116	80	190	1,290	conv. 6% cum. pfd.	100	68,000	6.00		47.53
32¼	29⅜	31⅜	58⅜	24⅜	79½	37½	37,500	732,895	Amer. Smelt. & Refin.	No	1,830,000	4.00	3.77	10.02
124½	123¾	...	138⅛	117½	141	131	600	11,900	7% cum. pfd.	100	500,000	7.00		43.66
1¼	⅝	¾	4½	⅝	22½	2	29,300	54,300	Amer. Solvents & Chem	No	503,000		d2.86	2.56
5½	4¼	5	8¾	3⅜	17⅛	3⅜	1,500	25,900	Amer. Zinc. Lead, & Smelt	25	200,000		d1.46	0.53
45¼	45¼	45¼	45⅝	26¾	79¾	26¾	100	13,100	6% cum. pfd.	25	80,000			7.32
25⅛	23¼	24¼	43⅛	18¾	81½	25	167,300	4,006,925	Anaconda Copper Mining	50	8,859,000	2.50	e2.07	8.29
10¼	9⅛	10	18	8	29½	13½	4,200	89,500	Archer Dan. Midland	No	550,000	2.00	Yr. Aug. 30 1.68	
18¼	14¼	16⅛	23⅜	11¼	51⅜	16⅜	60,300	665,200	Atlantic Refining Co.	25	2,690,000	1.00	1.02	6.20
39	36¼	38	54	30	106	42	1,100	29,600	Atlas Powder Co.	No	265,000	4.00	2.67	7.66
88	86	86	99⅞	84⅜	106	97	410	3,350	6% cum. pfd.	100	96,000	6.00		28.25
1	1	1	2	¾	5¼	⅞	100	17,600	Butte & Sup. Mining	10	290,000			Nil
2	1⅜	1⅜	2⅜	1¼	4½	1½	900	29,400	Butte Copper & Zinc	5	600,000		Nil	0.34
6¼	5	5	7¼	2¼	15⅜	2	5,500	70,400	Certain-Teed Products	No	400,000		d7.61	Nil
35	26	35	25⅛	8½	45½	6¾	700	4,410	7% cum. pfd.	100	63,000			Nil
45¼	43¼	45	50⅛	40	64⅞	44	6,600	70,500	Colgate-Palmolive-Peet	No	2,000,000	2.50	3.76	4.03
76¼	63¾	66¼	111⅜	55	199	65½	46,400	498,520	Columbian Carbon	No	499,000	5.00	5.04	7.84
18⅜	16	17	21⅜	10⅜	38	14	180,300	1,949,190	Comm. Solvents	No	2,530,000	1.00	1.07	1.51
67½	63¼	65½	86⅛	55⅛	111⅛	65	26,400	538,500	Corn Products	25	2,530,000	3.00	4.82	5.49
150½	148	148½	152½	146½	151½	140	860	6,030	7% cum. pfd.	100	250,000	7.00		62.59
12½	10½	11	23	9⅛	43⅛	10	8,800	272,100	Davison Chem. Co.	No	504,000		Yr. Je. '30 4.00	
14½	14⅜	14½	19½	11	42⅜	11½	800	21,000	Devoe & Raynolds "A"	No	160,000	1.20	2.24	4.52
...	...	...	109	100	114½	99		610	7% cum. 1st pfd.	100	16,000	7.00		67.59
90½	83	85½	107	71	145½	80½	228,500	2,964,600	DuPont de Nemours	20	11,014,000	4.00	4.52	6.99
124½	123	123	124⅜	118⅛	123	114½	2,000	21,820	6% cum. deb.	100	978,000	6.00		78.54
148½	132⅛	142	185⅜	118	255½	142½	75,364	1,045,369	Eastman Kodak	No	2,261,000	5.00	8.84	9.57
134	131¼	133	134½	126	134	120¼	230	1,360	6% cum. pfd.	100	62,000	6.00		356.89
27¼	25	26¼	43¼	22	55½	24½	20,800	689,600	Freeport Texas Co.	No	730,000	4.00	w4.77	5.60
23⅛	18½	21¼	47	15¼	71⅛	22⅜	21,600	506,600	General Asphalt Co.	No	413,000	3.00	2.44	4.71
10⅛	9¼	10⅛	16½	7¼	38	7	9,200	171,271	Glidden Co.	No	695,000		Yr. Oct. '30 Nil	
80	75	80	80	60	105¼	63½	1,250	6,940	7% cum. prior pref.	100	74,000	7.00	Yr. Oct. '30 Nil	
45	43	43	58	40	85	50	300	8,300	Hercules Powder Co.	No	603,000	3.00	2.61	5.95
116⅜	116¼	116¼	119½	111	123⅜	116¼	180	3,060	7% cum. pfd.	100	114,000	7.00		38.16
35⅜	27⅜	32⅛	86	21⅛	124	31	18,700	320,400	Industrial Rayon	No	200,000	4.00	7.74	7.26
2	1⅛	1⅛	5⅛	1⅛	8⅛	3⅛	1,600	33,600	Intern. Agric.	No	450,000		Yr. Je. '30 1.68	
18	17	17	51⅛	16⅛	67⅛	42⅛	2,200	13,700	7% cum. prior pfd.	100	100,000	7.00	Yr. Je. '30 14.58	
14	12	12⅛	20⅛	9⅛	44⅛	12⅛	172,300	4,499,800	Intern. Nickel	No	14,584,000	1.00	.67	1.47
35½	33½	34½	42	29¼	45⅞	31	3,500	346,000	Intern. Salt	No	240,000	3.00		11.32
54⅛	45⅛	51⅛	80⅛	40⅛	148⅛	48⅛	146,700	2,375,700	Johns-Manville Corp.	No	750,000	3.00	3.66	8.09
14	14	14	16½	10	25	8⅛	200	11,500	Kellogg (Spencer)	No	598,000	0.80	h1.14	2.36
27	25⅛	26	33	22	81⅞	39	900	184,800	Liquid Carbonic Corp.	No	342,000	4.00	Yr. Sep. '30 5.22	
11	9⅛	10⅛	17	7⅛	37⅜	10½	37,800	281,100	McKesson & Robbins	No	1,073,000	1.00	.96	2.65
33⅛	29⅛	30⅛	37⅛	20	49½	25⅞	3,700	36,400	conv. 7% cum. pref.	50	428,180	3.50		9.43
18	15⅛	16⅛	25	15⅞	39⅜	20	800	11,000	MacAndrews & Forbes	No	340,000	2.60	2.61	3.13
23⅜	21⅛	23	31¼	17⅜	51⅜	30½	3,800	370,465	Mathieson Alkali	No	650,000	2.00	2.96	3.31
118	117	118	125⅛	112	136	115	60	730	7% cum. pfd.	100	28,000	7.00		93.91
29	26½	28⅛	29	18⅛	63⅜	18⅜	4,400	48,100	Monsanto Chem.	No	416,000	1.25	1.71	4.25
29⅛	25	26⅜	36⅜	19⅜	39⅛	18⅛	14,100	292,700	National Dist. Prod.	No	252,000	2.00	1.23	1.42
...	...	104	132	85	189½	114		66,200	National Lead	100	310,000	5.00	7.58	25.49
140	140	140	143	135⅛	144	135	250	4,370	7% cum. "A" pfd.	100	244,000	7.00		41.95
118	118	118	120	118	120	116	10	4,130	6% cum. "B" pfd.	100	103,000	6.00		82.47
55	53	53	55	41	85	30	1,200	6,600	Newport $3 cum. conv. "A"	50	33,000	3.00	z5.94	29.79
39½	37	37⅞	46½	28½	55⅜	26⅛	9,900	270,600	Penick & Ford	No	425,000	1.00	4.01	3.97
64½	62⅛	63⅛	71⅛	56	78⅜	52⅜	7,100	186,800	Procter & Gamble	No	6,410,000	2.40	Yr. Je. '30 3.36	
9¼	7⅛	9	11⅛	5⅛	27⅛	7⅜	48,800	386,300	Pure Oil Co.	25	3,038,000		.18	1.52
85⅛	82	85	101⅛	67	114½	90½	380	8,040	8% cum. pfd.	100	130,000	8.00		22.55
27⅜	24	24	42⅛	24	56½	36⅜	16,800	291,500	Royal Dutch, N. Y. shs.		894,000		2.39	3.35
17	15⅜	15⅜	30⅜	14½	57⅛	19½	6,700	304,500	St. Joseph Lead	10	1,951,000	2.00	2.09	3.82
6¼	5	5⅜	10¼	4⅜	25⅜	5½	60,100	686,490	Shell Union Oil	No	13,071,000		d.56	1.26
42	35⅛	40⅛	51⅜	31⅜	75	42½	134,900	934,400	Standard Oil, Calif.	No	12,846,000	2.50	2.88	3.63
42⅛	36⅜	40⅛	52⅛	30⅜	84⅞	43⅛	276,500	3,037,425	Standard Oil, N. J.	25	25,419,000	1.00	1.65	4.76
21	17⅛	19⅛	26	13¼	40⅜	19⅛	166,400	1,840,055	Standard Oil, N. Y.*	25	17,809,000	1.60	.92	2.23
5⅜	5	5⅛	9⅛	5	17	7⅛	5,800	53,100	Tenn. Corporation	No	857,000	1.00	1.21	2.19
					60½	28½			Texas Corp.	25	9,851,000	3.00	1.53	4.91
35⅞	33⅛	35⅛	55⅛	29⅛	67⅜	40⅛	24,300	1,430,200	Texas Gulf Sulphur	No	2,540,000	4.00	5.50	6.40
53¼	47⅜	50⅛	72	43⅛	106⅜	52⅜	162,000	2,953,075	Union Carbide & Carb.	No	9,001,000	2.60	3.12	3.94
16⅛	14⅛	15	28⅛	13	84	14⅜	3,900	416,400	United Carbon Co.	No	398,000		1.43	1.94
35¼	27⅛	33	77⅛	24⅛	139⅜	50⅛	56,700	751,200	U. S. Ind. Alc. Co.	No	374,000	6.00	z2.96	12.63
29⅛	24⅛	27⅞	76⅛	23⅛	143⅞	44⅛	207,800	7,471,300	Vanadium Corp. of Amer.	No	378,000	3.00	2.95	4.91
1⅛	1⅛	1⅛	3⅛	1	8⅞	1⅛	1,900	16,200	Virginia Caro. Chem.	No	487,000		Yr. Je. '30 Nil	
9	8	8	17	7⅛	34⅛	9	300	14,950	6% cum. part. pfd.	100	213,000		Yr. Je. '30 2.63	
62	58½	58½	72	58½	82⅜	67½	600	6,300	7% cum. prior pfd.	100	145,000	7.00	Yr. Je. '30 11.96	
19½	17¼	18	40	17¼	59½	18	6,700	71,850	Westvaco Chlorine Prod.	No		2.00	2.51	4.32

h 11 mos. ending Aug. 30
w 13 mos.
z Before inventory adjustment
* Socony Vacuum

NEW YORK CURB

8½	5⅞	...	8½	5	13	3⅜	1,700	4,400	Acetol Prod. conv. "A"	No	60,000			0.42
7	7	7	19½	5	34	16	100	85,725	Agfa Ansco Corp.	No	300,000			Nil
138½	108½	131½	224	90	356	140½	16,150	139,818	Aluminum Amer.	No	1,473,000		z1.93	11.18
101	99¼	99½	109⅜	89	111½	104	2,200	23,800	6% cum. pfd.	100	1,473,000	6.00		17.19
89	82	82	102	40½	232	57⅛	400	12,200	Aluminum Ltd.	No	573,000			4.15
8⅛	7⅛	7⅞	12¾	6½	37	6⅛	24,200	485,600	Amer. Cyanamid "B"	No	2,404,000			4.15
1½	⅞	1	15	⅞	43⅛	7½	15,700	66,800	Anglo-Chilean Nitrate	No	1,757,000		Yr. Je. '30 Nil	
...	...	...	4	⅜	6¼	⅜		21,706	Assoc. Rayon Corp.	No	1,200,000		Yr. Je. '30 1.87	
...	...	...	60	32¼	60½	31¼		47,300	conv. 6% cum. pfd.	100	200,000	6.00		

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1931 August High	1931 August Low	1931 Last	1931 High	1931 Low	1930 High	1930 Low	Sales In August	Sales During 1931	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1930	Earnings $-per share-$ 1929
1⅞	1½	...	1⅞	1½	5½	1⅛	1,300	22,600	Brit. Celanese Am. Rcts.	2.43	2,806,000			0.03
80	79¼	...	81½	68½	90	48	50	2,450	7% cum. part. 1st pfd.	100	148,000	7.00		14.50
58⅜	55	...	65	45½	90	70	325	3,735	7% cum. prior pfd.	100	115,000	7.00		25.70
...	...	...	...	...	20	3½		6,440	Celluloid Corp.	No	195,000			1.76
...	...	...	9	7¼	13½	8⅜		3,700	Courtaulds, Ltd.	1£				0.34
40½	40½	40½	51	34	100	49	100	10,800	Dow Chemical	No	630,000	2.00	3.44	4.08
69⅜	56	65⅜	75½	38	166⅞	58½	22,000	199,900	Gulf Oil	25	4,525,000	1.50		9.83
...	...	...	13	9	23	10½		2,400	Heyden Chemical Corp.	10	150,000			3.08
...	...	...	3½	3⅛	7	4		2,300	Imperial Chem. Ind.	1£				0.49
...	...	...	...	...	16	3½		100	Monroe Chem.	No	126,000			2.54
41	40	40	60	36	79½	45	600	6,000	Shawinigan W. & P.	No	2,178,000	2.50		2.35
62	60	...	66⅛	58	85	58	500	7,050	Sherwin-Williams Co.	25	636,000	4.00	Yr. Aug. '30 4.14	
6	3½	4½	12	3½	34½	3⅜	3,700	33,800	Silica Gel Corp.	No	600,000			
27⅞	22½	27½	38½	19¼	59⅞	30	111,200	214,200	Standard Oil Ind.	25	16,851,000	2.50	2.73	4.66
26	25½	25½	30⅝	24¼	34½	27	5,200	52,700	Swift & Co.	25	6,000,000	2.00	2.08	2.18
5½	5	5	16	3⅜	22¾	3	2,200	141,650	Tubize "B"	No	600,000	10.00		
...	...	...	28⅞	14	44	14		22,700	United Chemicals $3 cum. part. pfd.	No	115,000	3.00		7.66
									CLEVELAND					
76	76	76	94	76	96	91½	5	1,475	Cleve-Cliffs Iron $5 pfd.	No	498,000	5.00	11.42	
42½	40¼	40¼	51½	34½	100	48	279		Dow Chemical Co.	No	630,000	2.00	3.44	4.08
62½	60	60	68½	53¾	85	57½	1,018	14,883	Sherwin-Williams Co.	25	636,000	4.00	Yr. Aug. '30 4.14	
									CHICAGO					
37¼	33½	35	39⅞	33½	46½	33½	2,200	8,750	Abbott Labs.	No	145,000	2.50	3.32	4.92
5	4	5	5½	4	15	3½	130		Monroe Chem.	No	126,000		1.09	2.54
30½	30½	30½	33	21	35	15½	10	1,750	$3.50 cum. pref.	No	30,000	3.50		13.35
26	25½	25½	30½	24½	33¼	27	17,600	56,750	Swift & Co.	25	6,000,000	2.00	2.08	2.18
									CINCINNATI					
64	63	63½	71	56	110	53½	2,515	25,249	Procter & Gamble	No	6,410,000	2.40	Yr. Je. '30 3.36	
									PHILADELPHIA					
60	60	60	81¼	58	100	89	500	2,400	Pennsylvania Salt	50	150,000	5.00	Yr. Je. '30 7.97	

The Industry's Bonds

1931 August High	1931 August Low	1931 Last	1931 High	1931 Low	1930 High	1930 Low	Sales In August	Sales During 1931	ISSUE	Date Due	Int. %	Int. Period	Out-standing $
									NEW YORK STOCK EXCHANGE				
88	86	88	99	83¾	100½	93	14	224	Amer. Cyan. deb. 5s.	1942	5	A. O.	4,554,000
97¼	94	95¾	102	94	177	94⅜	524	3,444	Amer. I. G. Chem. conv. 5½s.	1949	5½	M. N.	29,933,000
104	102¼	103	104½	101½	104	101	215	3,104	Am. Smelt & Ref. 1st. 5s. "A"	1947	5	A. O.	36,578,000
58	53	54½	63½	47	98½	67	47	644	Anglo-Chilean s. f. deb. 7s.	1945	7	M. N.	14,600,000
102½	101¼	102	103	100½	103	100	141	1,224	Atlantic Refin. deb. 5s.	1937	5	J. J.	14,000,000
98	97	...	104	97	105½	100½	15	573	Interlake Iron Corp. 1st 5½s "A"	1945	5½	M. N.	6,629,000
105⅜	103	105	105⅜	102	104½	97½	33	116	Corn Prod. Refin. 1st s. f. 5s.	1934	5	M. N.	1,822,000
32½	22	24	75½	22	87½	38	538	4,270	Lautaro Nitrate conv. 6s.	1954	6	J. J.	32,000,000
89	85	88	96	75	100½	87	122	1,215	Pure Oil s. f. 5½% notes	1937	5½	F. A.	17,500,000
97¼	95	96½	103	88	104	93¾	79	703	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
105½	103¾	104¾	105½	102	104¾	100	729	5,690	Standard Oil, N. J. deb. 5s.	1946	5	F. A.	120,000,000
101	100½	100½	106½	97¾	104¼	96½	325	4,039	Standard Oil, N. Y. deb. 4½s.	1951	4½	J. D.	50,000,000
89½	85	85¼	99	85	102½	90½	34	1,435	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000
									NEW YORK CURB				
105½	104	...	105½	102¾	104⅞	100½	212,000	1,702,000	Aluminum Co., s. f. deb. 5s.	1952	5	M. S.	37,115,000
99	97½	93	104¾	93¾	104½	96¾	66,000	948,000	Aluminum Ltd., 5s.	1948	5	J. J.	20,000,000
26	24½	...	56	24½	60	51	26,000	36,000	Amer. Solv. & Chem. 6½s.	1936	6½	M. S.	1,737,000
					80	51			General Rayon 6s. "A"	1948	5	J. D.	5,085,000
103½	101½	102⅞	103½	101½	104	90¼	185,000	534,000	Gulf Oil, 5s.	1937	5	J. D.	30,414,000
102½	101½	102	104	98½	104	99	133,000	1,951,000	Sinking Fund deb. 5s.	1947	5	F. A.	35,000,000
100½	98	...	102⅞	93½	103½	95⅝	162,000	1,497,000	Koppers G. & C. deb, 5s.	1947	5	J. D.	23,050,000
97½	92½	93½	98⅛	92⅝	98⅝	90¼	450,000	2,742,000	Shawinigan W. & P. 4½s. "A"	1967	4½	A. O.	35,000,000
97½	93	93½	98½	93	98¼	90½	82,000	761,000	4½s., series "B"	1968	4½	M. N.	16,108,000
104½	103½	103½	104	102	103½	79½	75,000	648,000	Swift & Co., 5s.	1944	5	J. J.	22,916,000
103½	102¼	...	104⅛	101	103½	100½	21,000	201,000	Westvaco Chlorine Prod. 5½s.	1937	5½	M. S.	1,992,000

The Trend of Prices

Important Price Changes

Advances	June	July
Sodium Silicofluoride	$ .04¼	$ .04½
Sodium Stannate	.21	.19½
Tin Crystals	.26	.24½
Tin Tetrachloride	.183	.1740
Wax, Carnauba, No. 1	.31½	.30
Declines		
Acid, Tartaric	.29½	.31½
Ammonium Sulfate, imp. ton	$21–22.00	$25.00
Cream of Tartar	.22¼	.22¾
Gum, Arabic, amber sorts	.08½	.09
Quicksilver, flask	$82.00	$90.00
Tankage	1.55	1.75

Chemical business underwent another month of extremely quiet conditions. Both shipments against existing contracts and spot sales were at the low point for the present year and considerably below the same month a year ago. Under these conditions the price structure presented a much firmer appearance and for the second consecutive month the CHEMICAL MARKETS Average Price for 20 representative chemicals remained unchanged.

A further outcrop of severe competition occurred between the domestic producers and importers of tartaric acid. With the failure of the foreign quicksilver cartel an assured fact, prices fell off in a very marked degree. Naval stores prices were again lower in the face of slackened demand. Tin derivatives were much higher due to a pronounced rise in the metal market. The fertilizer industry is forced to mark time until the present uncertainty over nitrogen prices is relieved. Cables from abroad seem to indicate some tentative agreement between most of the synthetic producers. With the political situation in Chile unfavorable, hope exists that natural and synthetic producers might patch up their differences for the moment at least. Meanwhile, prices in this country are nominal with buyers awaiting a final word.

Business activity continued to reflect extremely poor business conditions aggrevated by summer dullness. Retail trade was at best only fair and wholesalers complain that orders while frequent, were small. Production in most lines went to new low levels during August.

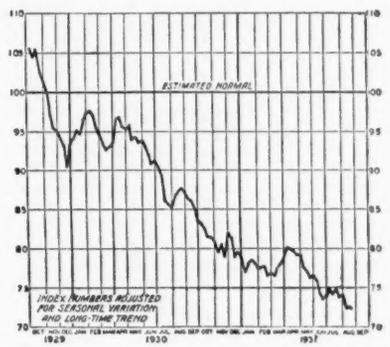
In the commodity markets stabilization has apparently been reached or nearly so for most of the commodity indices show little or only very slight recessions from July, while July was very close to or, equal to June. This perhaps, more than any other single factor, is likely to cause buyers to contract ahead in better volume. Wheat and copper were still uncertain factors while cotton acted in a fairly stable manner in face of adverse news on the crop situation.

Iron and steel remain very quiet. Automobile production sank to lower levels when several manufacturers closed temporarily. Collections were reported to be very slow. The textile industry continues to be a bright spot although prices are low. The tanners after a spurt fell off. The glass, paper and soap industries were operating at reduced schedules. Petroleum activity was halted by the enforcement of curtailment in Texas and Oklahoma by means of martial law.

The National Fertilizer Association wholesale price index continues to reflect a slowing up in the downward movement, the index being only two fractional points off on Aug. 22 when compared with the previous week but 1.3 points when compared with a month ago.

	Latest Week Aug. 22	*Preceding*	*Month Ago*	*Year Ago*
All groups (14)	67.5	67.7	68.8	86.1
Other	....	....	....	88.1
Fuel	....	....	....	84.9
Grains	....	....	....	89.2
Textiles	....	....	....	71.5
Miscellaneous commodities	....	....	....	79.3
Metals	77.0	77.0	77.3	84.6
Fats and oils	59.8	59.8	57.3	85.2
Chemicals and drugs	86.8	86.8	86.8	95.0
Fertilizer materials	75.7	75.8	76.4	84.4
Mixed fertilizer	81.2	81.2	82.7	96.0

The NEW YORK TIMES weekly index of business activity was lower in August.



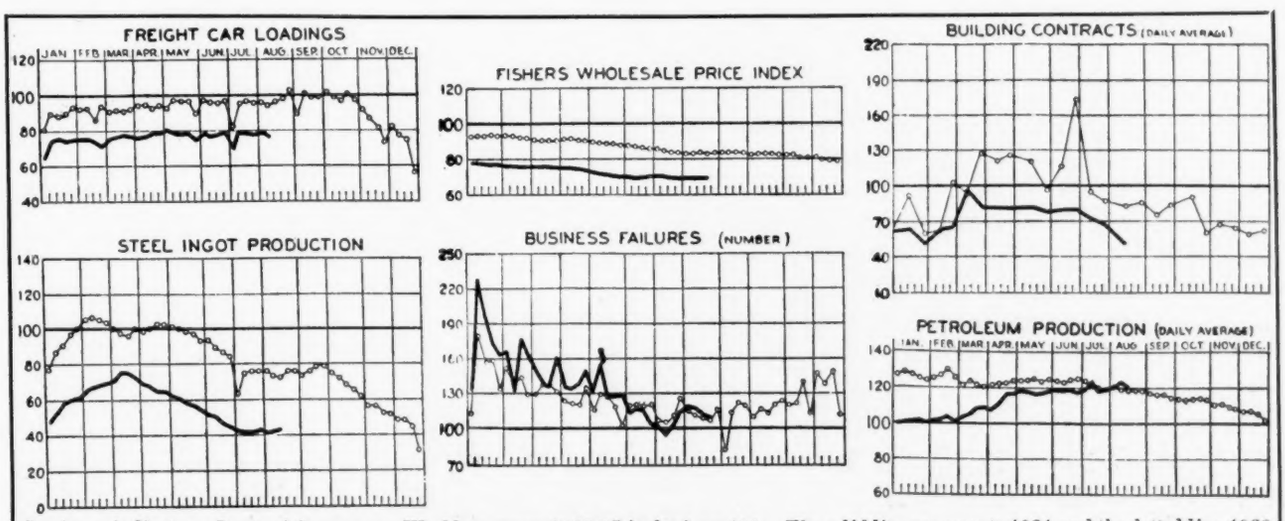
	Week Ended Aug.22 1931	*Aug.15 1931*	*Aug.23 1930*
Freight car loadings	*71.5	70.7	88.3
Steem mill activity	44.6	45.3	84.5
Electric power production	82.8	83.0	92.0
Automobile production	52.9	54.7	77.5
Cotton cloth production	90.6	94.0	70.6
Combined index	*72.3	72.4	87.9

*Subject to revision

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, June	249,462	315,115	334,506
†Brokers Loans, Aug. 1	$1,344	$1,391	$3,689
*Building Contracts, July	$285,997	$331,879	$367,528
*Car Loadings, Aug. 29	742	734	922
†Commercial Paper, June 30	$292	$305	$527
Factory Payrolls, July	64.4	67.6	82.6
*Mail Order Sales, July	$46,093	A$50,070	$48,790
Number of Failures, Dun, July	1,983	1,993	2,028
*Merchandise Imports, July	$176,000	$182,000	$250,343
*Merchandise Exports, July	$187,000	$205,000	294,701
Furnaces in Blast %, Aug. 1	26.1	29.0	45.3
*Steel Unfinished Orders, July 31	3,404	3,479	4,022

*000 omitted. †000,000 omitted. AMay.


FREIGHT CAR LOADINGS
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
FISHERS WHOLESALE PRICE INDEX
BUILDING CONTRACTS (DAILY AVERAGE)
STEEL INGOT PRODUCTION
BUSINESS FAILURES (NUMBER)
PETROLEUM PRODUCTION (DAILY AVERAGE)

Business indicators, Dept. of Commerce. Weekly average 1923-25 inclusive = 100. The solid line represents 1931 and the dotted line 1930

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

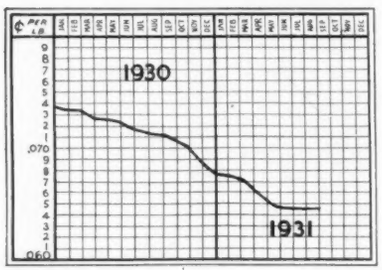
Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

Average Price Remains Stationary



CHEMICAL MARKETS Average Price for 20 representative chemicals for the second consecutive month held at the level reached in June. In July one decline offset one advance while in August no change was made in any of the group comprising the Price.

Acetone — During the month producers announced a reduction of ¼c. Buyers are continuing to purchase for only immediate requirements. Material moved against existing contracts in fair volume, but spot sales were below the previous month. Exports of acetone from the United States totaled 1,826,941 pounds for the first six months in 1931. This compared with 1,564,000 pounds in the same period a year ago.

Acid Acetic — The market in this commodity was rather a dull affair. Shipments into the textile centers were fair, but other outlets were taking material only in very restricted quantities. Prices were unchanged from levels in force for the past four months.

Acid Boric — Withdrawals against existing contracts were in fair volume, but spot business was off considerably. The price structure remained unchanged.

Acid Chromic — With automotive production considerably below normal, demand from platers was spotty. However, with the turn of the present month considerable pick-up was expected from this quarter. Ford announced on Sept. 1 that operations would be resumed on Sept. 8. Prices were unchanged.

Acid Citric — Demand slumped off slightly from the levels maintained during July. The price structure was firm at evels established a month ago.

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21 .18½	.21	.21	.18½	.21	.18½
Acetaldol, 50 gal dr.....lb.	.27	.31 .27	.31	.31	.27	.31	.27
Acetamide.....lb.	.95	1.35 .95	1.35	1.35	1.20		
Acetanilid, tech, 150 lb bbl...lb.	.20	.23 .20	.23	.23	.21	.24	.21
Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.21	.25 .21	.25	.29	.25	.35	.28
Acetin, tech drums.....lb.	.30	.32 .30	.32	.32	.30	.32	.30
Acetone, tanks.....lb.	...	.09½ .09½	.10½	.12	.11	.16	.11
Acetone Oil, bbls NY.....gal.	1.15	1.25 1.15	1.25	1.25	1.15	1.25	1.15
Acetyl Chloride, 100 lb cby...lb.	.55	.68 .55	.68	.68	.55	.68	.45
Acetylene Tetrachloride (see tetrachlorethane).....							
Acids							
Acid Abietic.....	.12	.12 .12	.12	.....	.....	.....	.....
Acetic, 28% 400 lb bbls c-1 wks.....100 lb.	.....	2.60	2.60	3.88	2.60	3.88	3.88
Glacial, bbl c-1 wk.....100 lb.	.....	9.23	9.23	13.68	9.23	13.68	13.68
Glacial, tanks.....	.....	8.98	8.98	13.43	8.98		
Adipic.....	.72	.72 .72	.72	...	.....	.....	.....
Anthranilic, refd, bbls.....lb.	.85	.95 .85	.95	1.00	.85	1.00	.98
Technical, bbls.....lb.	.65	.70 .65	.80	.80	.75	.80	.80
Battery, cbys.....100 lb.	1.60	2.25 1.60	2.25	2.25	1.60	2.25	1.60
Benzoic, tech, 100 lb bbls....lb.	.35	.45 .35	.45	.53	.40	.60	.51
Boric, crys. powd, 250 lb. bbls.....lb.	.06½	.07 .06½	.07¼	.07¼	.06½	.07¼	.05¼
Broenner's, bbls.....lb.	1.20	1.25 1.20	1.25	1.25	1.20	1.25	1.25
Butyric, 100% basis cbys.....lb.	.80	.85 .80	.85	.90	.80	.90	.85
Camphoric.....lb.	.....	5.25	5.25	5.25	5.25	5.25	4.85
Chlorosulfonic, 1500 lb drums wks.....lb.	.04½	.05½ .04½	.05½	.05½	.04½	.05½	.04½
Chromic, 99½%, drs.....lb.	.14½	.16 .14½	.17	.19	.15	.23	.17½
Chromotropic, 300 lb bbls....lb.	1.00	1.06 1.00	1.06	1.06	1.00	1.06	1.00
Citric, USP, crystals, 230 lb. bbls.....lb.	.....	.35 .35	.43	.59	.40	.70	.46
Cleve's, 250 lb bbls.....lb.	.52	.54 .52	.54	.54	.52	.59	.52
Cresylic, 95%, dark drs NY..gal.	.47	.60 .47	.60	.70	.54	.54	.60
97-99%, pale drs NY.....gal.	.50	.60 .50	.60	.77	.58	.77	.72
Formic, tech 90%, 140 lb. cby.....lb.	.10½	.12 .10½	.12	.12	.10½	.12	.10½
Gallic, tech, bbls.....lb.	.60	.70 .60	.70	.55	.50	.12	.50
USP, bbls.....lb.	.....	.74	.74	.74	.74	.55	.74
Gamma, 225 lb bbls wks.....lb.	.77	.80 .77	.80	.80	.77	.80	.74
H, 225 lb bbls wks.....lb.	.60	.70 .60	.70	.70	.65	.99	.80
Hydriodic, USP, 10% soln cby lb.	.....	.67	.67	.67	.67	.72	.67
Hydrobromic, 48%, coml, 155 lb cbys wks.....lb.	.45	.48 .45	.48	.48	.45	.67 .48	.45
Hydrochloric, CP, see Acid Muriatic.....				.....	.....	.....	.....
Hydrocyanic, cylinders wks...lb.	.80	.90 .80	.90	.90	.80	.90	.80
Hydrofluoric, 30%, 400 lb bbls wks.....lb.	.....	.06	.06	.06½	.06	.06	.06
Hydrofluosilicic, 35%, 400 lb bbls wks.....lb.	...11	.12 .11	.12	.12	.11	.11	.11
Hypophosphorous, 30%, USP, demijohns.....lb.	.....	.85	.85	.85	.85	.85	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½ .04	.04½	.05	.04	.05½	.04½
44%, light, 500 lb bbls.....lb.	.11½	.12 .11½	.12	.12	.11	.12½	.11
Laurent's, 250 lb bbls.....lb.	.36	.42 .36	.42	.42	.36	.42	.40
Linoleic.....lb.	.16	.16 .16	16	.....	.....	.....	.....
Malic, powd., kegs.....lb.	.45	.60 .45	.60	.60	.45	.60	.48
Metanilic, 250 lb bbls.....lb.	.60	.65 .60	.65	.65	.60	.65	.60
Mixed Sulfuric-Nitric..... tanks wks.....N unit	.07	.07¼ .07	.07¼	.07¼	.07	.07¼	.07
tanks wks.....8 unit	.008	.01 .008	.01	.01	.008	.01	.008
Monochloroacetic, tech bbl..lb.	.20	.30 .20	.30	.30	.18	.21	.18
Monosulfonic, bbls.....lb.	1.65	1.70 1.65	1.70	1.70	1.65	1.70	1.65
Muriatic, 18 deg, 120 lb cbys c-1 wks.....100 lb.	.....	1.35	1.35	1.35	1.35	1.40	1.35
tanks, wks. 100 lb.		1.00	1.00	1.00	1.00	1.00	1.00
20 degrees, cbys wks...100 lb.	.....	1.45	1.45	....	1.45	....	1.45
N & W, 250 lb bbls.....	.85	.95 .85	.95	.95	.85	.95	.85
Naphthionic, tech, 250 lb.....	.60	.65 .60	.65	Nom.	.....	.59	.55
Nitric, 36 deg, 135 lb cbys o-wks.....100 lb.	.....	5.00	5.00	5.00	5.00	5.00	5.00
40 deg, 135 lb cbys, c-1 wks.....100 lb.	.....	6.00	6.00	6.00	6.00	6.00	6.00
Oxalic, 300 lb bbls wks NY...lb.	.11	.11¼ .10¾	.11½	.11¾	.11	.11¾	.11
Phosphoric 50%, U. S. P.....lb.	.....	.14	.14	.14	.14	.14	.08
Syrupy, USP, 70 lb drs....lb.	.....	.14	.14	)	.14	.16	.14
Commercial, tanks,.....Unit.	.....	.80	.80	.80	.80	.....	.....
Picramic, 300 lb bbls.....lb.	.65	.70 .65	.70	.70	.65	.70	.65
Picric, kegs.....lb.	.30	.50 .30	.50	.50	.30	.50	.30
Pyrogallic, crystals.....							
.....lb.	1.50	1.60 1.50	1.60	1.60	1.30	1.40	.86
Salicylic, tech, 125 lb bbl.....lb.	.33	.37 .33	.37	.37	.33	.42	.33
Sulfanilic, 250 lb bbls.....lb.	.15	.16 .15	.16	.16	.15	.16	.15
Sulfuric, 66 deg, 180 lb cbys 1c-1 wks.....100 lb.	1.60	1.95 1.60	1.95	1.95	1.60	1.95	1.60
tanks, wks. ton		15.00	15.00	15.50	15.00	15.50	15.50
1500 lb dr wks.....100 lb.	1.50	1.65 1.50	1.65	1.65	1.50	1.65	1.50
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½ 1.27½	1.42½	1.42½	1.27½	1.42½	1.27½

Chlorine
Caustic Soda
Sulphur Chloride
Carbon Bisulphide
Carbon Tetrachloride

Alumina Hydrate
Phosphoric Acid
Mono Sodium Phosphate
Di Sodium Phosphate
Tri Sodium Phosphate

Sodium Sulphide
Barium Peroxide

THE WARNER CHEMICAL COMPANY

CHRYSLER BUILDING NEW YORK CITY

Manufacturers of Industrial Chemicals and Distributors for Westvaco Chlorine Products, Inc.

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

Acid Oxalic — Demand was spotty. Contract customers were making a better showing, specially from the laundry trade. Prices were held firmly at former levels.

Acid Sulfuric — The situation both locally and in Baltimore showed no basic change from July. Consumption is off considerably, even when comparison is had with 1930, but production has been scheduled to meet reduced demands.

Acid Tartaric — After several months of fairly stable prices a further reduction of a cent a lb. for domestic material was placed in effect on Aug. 27. With consumption below normal the competitive position between domestic and imported has become more serious. Imported was reduced during the month.

Alcohol — Rumors were numerous that production during the coming winter might be further curtailed through official action by the Bureau of Industrial Alcohol. Such action would tend to reduce the present surplus. Actual shipments were small during the month. Treasury Decision No. 3, effective August 10th, which prescribes a revision in the formula of Completely Denatured Alcohol No. 5, added 1 cent per gallon to the distiller's price on this formula.

Distillers in announcing this price advance which will be applied to existing contracts, call attention also to possibly other advances to follow increased freight rates if the carriers are successful in their plea to the I. C. C. for higher tariffs. The statement says: "This advance in prices is covered by Paragraph 8 of the covenants in our contract, which reads: 'U. S. revision of denaturants in the composition of the alcohol bought and sold herein and changes in freight rates will affect the price of this contract accordingly.' We also call to your attention the fact that the railroads have filed application with the Interstate Commerce Commission for an advance in freight rates. If this increase in freight rate is granted to the railroads, such amount will have to be added to the price stipulated in contracts that name a delivered price."

Alums — A fair quantity moved into water filtering and paper manufacture, but shipments are considerably below last year.

Ammonia Anhydrous — Demand fell off in August from the July figures, but shipments continued to be in rather favorable quantities. Prices are firm.

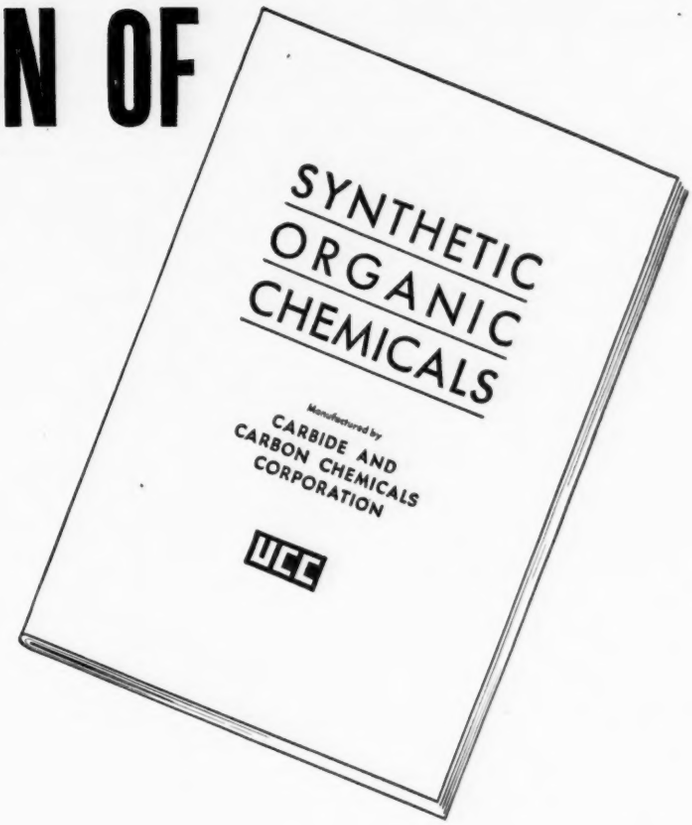
Ammonia Aqua — Prices were well sustained despite the easing in demand from the textile centers. Bottlers, however were taking sizable quantities.

Ammonium Sulfate — On account of the agitation over the "anti-dumping"

*New formula

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Oleum, 20%, 1500 lb. drs 1c-1 wks ..... ton	.....	18.50	.....	18.50	18.50	18.50	18.50	18.50
40%, 1c-1 wks net ..... ton	.....	42.00	.....	42.00	42.00	42.00	42.00	42.00
Tannic, tech, 300 lb bbls.. lb.	.23	.40	.23	.40	.40	.23	.40	.30
Tartaric, USP, gran. powd, 300 lb. bbls ..... lb	.....	.29½	.....	.29½	.38½	.33	.38½	.38
Tobias, 250 lb bbls ..... lb.	.....	.85	.....	.85	.85	.85	.85	.85
Trichloroacetic bottles ..... lb.	.....	2.75	.....	2.75	2.75	2.75	2.75	2.75
Kegs ..... lb.	.....	2.00	.....	2.00	2.00	2.00	2.00	2.00
Tungstic, bbls ..... lb.	1.40	1.70	1.40	1.70	1.70	1.40	2.25	1.00
Albumen, blood, 225 lb bbls.. lb.	.38	.40	.38	.40	.40	.38	47	.38
dark, ... bbls., lb.	.12	.20	.12	20	.20	.12	.20	.12
Egg, edible ..... lb.	.....	.60	.55	.60	.75	.55	.83	.70
Technical, 200 lb cases .. lb.	.....	.50	.48	.50	.73	.50	.80	.70
Vegetable, edible ..... lb.	.60	.65	.60	.65	.65	.60	.65	.60
Technical ..... lb.	.50	.55	.50	.55	.55	.50	.55	.50
Alcohol								
Alcohol Butyl, Normal, 50 gal drs c-1 wks ..... lb.	.16½	.17½	.16½	.17½	.18½	.17½	.17½	.17½
Drums, 1-c-1 wks ..... lb.	.16½	.17½	.16½	.17½	.18½	.17½	.18½	.17½
Tank cars wks ..... lb.	.15½	.16½	.15½	.16½	.17½	.16½	.17½	.16½
Amyl (from pentane) Tanks wks ..... lb.	.....	.203	.203	.236	.236	.236	1.67	1.67
Diacetone, 50 gal drs del.. gal.	1.42	1.60	1.42	1.60	1.60	1.42	1.80	1.42
Ethyl, USP, 190 pf, 50 gal bbls ..... gal.	2.55	2.65	2.37	2.75	2.75	2.63	2.75	2.69½
Anhydrous, drums ..... gal.	.54	.58	.54	.60	.71	.56	.71	.71
No. 5,*188 pf, 50 gal drs. drums extra ..... gal.	.28	.29	.27	.44	50	.40	.51	.48
*Tank, cars ..... gal.	.....	.25	.24	.38	.48	.37	.50	.46
Isopropyl, ref, gal drs ..... gal.	.60	.65	.60	1.00	1.00	.60	1.30	1.00
Propyl Normal, 50 gal dr.. gal.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Alcotate, tanks ..... gal.	.....	.60	.60	.60	.....	.....	.....	.....
Aldehyde Ammonia, 100 gal dr lb.	.80	.82	.80	.82	.82	.80	.82	.80
Alpha-Naphthol, crude, 300 lb bbls ..... lb.	.60	.65	.60	.65	.65	.60	.65	.65
Alpha-Naphthylamine, 350 lb bbls ..... lb.	.32	.34	.32	.34	.34	.32	.34	.32
Alum Ammonia, lump, 400 lb bbls, 1c-1 wks ..... 100 lb.	3.20	3.50	3.20	3.50	3.50	3.20	3.50	3.25
Chrome, 500 lb casks, wks ..... 100 lb.	4.50	5.25	4.50	5.25	5.25	4.50	5.50	5.00
Potash, lump, 400 lb casks wks ..... 100 lb.	3.25	3.50	3.10	3.50	3.50	3.10	3.50	3.00
Soda, ground, 400 lb bbls wks ..... 100 lb.	3.50	3.75	3.50	3.75	3.75	3.50	3.75	3.75
Aluminum Metal, c-1 NY. 100 lb.	22.90	24.30	22.90	24.30	24.30	24.30	24.30	24.30
Chloride Anhydrous, ... lb.	.05	.09	.05	.09	.15	.05	.20	.05
Hydrate, 96%, light, 90 lb bbls ..... lb.	.16	.17	.16	.17	.18	.16	.18	.17
Stearate, 100 lb bbls ..... lb.	.20	.21	.18	.22	.26	.19	.26	25
Sulfate, Iron, free, bags c-1 wks ..... 100 lb.	1.90	1.95	1.90	1.95	2.05	1.90	2.05	1.95
Coml, bags c-1 wks.. 100 lb.	1.25	1.30	1.25	1.30	1.40	1.25	1.40	1.40
Aminoazobenzene, 110 lb kegs lb.	.....	1.15	.....	1.15	1.15	1.15	1.15	1.15
Ammonium								
Ammonia anhydrous Com. tanks	.....	.05½	.....	.05½	.05½	.05½		
Ammonia, anhyd, 100 lb cyl. lb.	.15½	.15½	.15½	.15½	.15½	.15½	.14½	.14
Water, 26°, 800 lb dr del.. lb.	.....	.03½	.....	.03½	.03½	.03½	.03½	.03½
Ammonia, aqua 26° tanks	.....	.02½	.02½	.02½	.02½	.02½		
Acetate ..... lb.	.28	.39	.28	.39	.39	.28		
Bicarbonate, bbls., f.o.b. plant ..... 100 lb.	.....	5.15	.....	5.15	5.15	5.15	6.50	5.15
Bifluoride, 300 lb bbls ..... lb.	.21	.22	.21	.22	.22	.21	.22	.21
Carbonate, tech, 500 lb cs.. lb.	.10½	.12	.09	.12	.12	.09	.12	.09
Chloride, white, 100 lb. bbls wks ..... 100 lb.	4.45	5.15	4.45	5.15	5.15	4.45	5.15	4.45
Gray, 250 lb bbls wks .... lb.	5.25	5.75	5.25	5.75	5.75	5.25	5.75	5.25
Lump, 500 lb cks spot ... lb.	.11	.11½	.11	.11½	.11½	.11	.11½	.11
Lactate, 500 lb bbls ..... lb.	.15	.16	.15	.16	.16	.15	.16	.15
Ammonium Linoleate ..... lb.	.15	.15	.15	.....	.....	.....	.....	.....
Nitrate, tech, casks ..... lb.	.06	.10	.06	.10	.10	.06	.10	.06
Persulfate, 112 lb kegs ..... lb.	.26	.30	.26	.30	.30	.26	.34	.26
Phosphate, tech, powd, 325 lb bbls ..... lb.	.11½	.12	.11½	.12	.13	.11½	.13	.12½
Sulfate, bulk c-1 ..... 100 lb.	1.50	1.60	1.50	1.80	2.10	1.75	2.40	2.05
Southern points ..... 100 lb.	1.50	1.60	1.50	1.75	2.10	1.82½	2.45	2.05
Nitrate, 26% nitrogen 31.6% ammonia imported bags c. i. f. ..... ton	34.60	35.00	34.60	35.00	57.60	45.00	60.85	52.40
Sulfocyanide, kegs ..... lb.	.36	.48	.36	.48	.48	.36	.48	.36
Amyl Acetate, (from pentane) Tanks ..... lb.	.....	.222	.....	.222	.236	.222	1.70	1.60
Tech., drs ..... lb.	.225	.236	.225	.236	.24	.225	.24	.23
Alcohol, see Fusel Oil								
Furoate, 1 lb tins ..... lb.		5.00	.....	5.00	5.00	5.00		
Aniline Oil, 960 lb drs ..... lb.	.14½	.16	.14½	.16	.16	.15	.16½	.15
Annatto, fine ..... lb.	.34	.37	.34	.37	.37	.34	.37	.34
Anthraquinone, sublimed, 125 lb bbls ..... lb.	.50	.55	.50	.55	.90	.50	.90	.80
Antimony, metal slabs, ton lots ..... lb.	.....	.06½	.06½	.07½	.09½	.06½	.10	.08½
Needle, powd, 100 lb cs .... lb.	.08½	.09	.08½	.09	.09½	.08	.10	.09
Chloride, soln (butter of) cbys ..... lb.	.13	.17	.13	.17	.17	.13	.18	.13
Oxide, 500 lb bbls ..... lb.	.08½	.08¾	.08½	.08¾	.08¾	.07½	.10	.08¾
Salt, 66%, tins ..... lb.	.22	.24	.22	.24	.24	.22	.26	.24
Sulfuret, golden, bbls ..... lb.	.16	.20	.16	.20	.20	.16	.20	.16
Vermilion, bbls ..... lb.	.38	.42	.38	.42	.42	.38	.42	.38
Archil, conc, 600 lb bbls ..... lb.	.17	.19	.17	.19	.19	.17	.19	.17
Double, 600 lb bbls ..... lb.	.12	.14	.12	.14	.14	.12	.14	.12
Triple, 600 lb bbls ..... lb.	.12	.14	.12	.14	.14	.12	.16	.12
Argols, 80%, casks ..... lb.	.....	.18¼	.....	.18¼	.18¼	.18¼	.18¼	.18¼
Crude, 30%, casks ..... lb.	.07	.07½	.07	.08	.08	.07¼	.08	.08

A NEW EDITION OF



IN THE YEAR that has elapsed since the last printing of this book several new compounds have been produced by Carbide and Carbon Chemicals Corporation. In addition, a large amount of new data on the properties and uses of our other synthetic organic chemicals and hydrocarbon gases has been accumulated.

The new products are described in this book and the data on the other compounds has been brought up to date. If you will address a request to our Technical Department or use the coupon below we will be glad to mail a copy to you promptly.

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DIETHYLENE GLYCOL
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ETHYLENE DICHLORIDE
ETHYLENE GLYCOL
ETHYLENE OXIDE
ISOPROPANOL
ISOPROPYL ETHER
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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

act, and the further decline in prices of foreign sulfate, which were being named as low as $22-21, buyers are naturally more or less puzzled. Actual tonnages changing hands are said to be small. The domestic producers continued to name $26 per ton ex-vessel or f.o.b. works and were also faced with little or no buying. Until the decision on anti-dumping is rendered and some indication of whether nitrate prices are going to lower levels the market will remain in a very nervous state.

Aniline Oil — Further improvement was in evidence in actual tonnages shipped, with prices firm and unchanged.

Arsenic — This commodity was active due to the prevalence of grasshopper plagues in the many of agricultural sections.

Benzoin Gum — The market for this commodity stiffened and an increase of ½c, effective Aug. 27 brought the current level up to 28c. Stocks are below normal and any slight flurry serves temporarily to firm prices. Generally speaking however the gum market was weaker.

Benzol — With coke-oven operation at a very low level the benzol market took on a very firm tone. Indicative of the curtailed operations in the coaltar products field are the German import figures. Imports of benzol into Germany during the first five months of 1931 fell by more than half from the high 1930 level. The United States, however, retained its position of leading supplier as noted in the following table for the first five months of 1931, 1930 and 1929:

	1929	*1930*	*1931*
United States	18,520	67,734	18,162
Saar territory	6,837	10,145	12,055
Czechoslovakia	5,177	7,550	4,257
Netherlands	4,675	5,161	4,497
Belgium	13,886	13,513	2,772
Polish Up. Sil.	7,180	8,700	2,279
Poland	251	544	....
Great Britain	3,355	689	2,134
Other countries	1,491	1,029	387
T'l. met. tons	61,372	115,065	46,543
Marks	21,953,000	40,230,000	12,810,000

Bleaching Powder — Both spot and contract business was very dull.

Borax — The basic conditions in this market have not changed. Shipments continue to be quite satisfactory under present business conditions and prices are stable.

Butyl Alcohol — The market maintained a firm undertone in the face of a very routine demand from most consuming industries. Some improvement in the automobile field is expected in September. Exports of butanol from the United States during the first half of 1931, amounting to 721,968 pounds, valued at $85,685, went to fourteen countries. The principal ones were as follows: Canada, 355,872 pounds, valued at $44,140; United Kingdom, 180,568 pounds,

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Aroclors, wks. lb.	.20	.20	.40	.40	.20	.....	.....
Arsenic, Red. 224 lb kegs, cs. lb.	.09½	.09½	.10	.11	.08½	.11	.09
White, 112 lb kegs lb.	.04	.03½	.05	.04½	.03½	.04½	.04
Asbestine, c-1 wks ton	.....	15.00	.....	15.00	15.00	15.00	4.75
Barium							
Barium Carbonate, 200 lb bags wks ton	56.50	56.50	57.00	60.00	60.00	58.00	60.00	57.00
Chlorate, 112 lb kegs NY lb.	.14	.14	.15	.15	.15	.14	.15	.14
Chloride, 600 lb bbl wks ton	63.00	63.00	69.00	69.00	69.00	63.00	69.00	63.00
Dioxide, 88%, 690 lb drs lb.	.12	.12	.13	.13	.13	.12	.13	.12
Hydrate, 500 lb bbls lb.	.04½	.04½	.05½	.05½	.05½	.04½	.05½	.04½
Nitrate, 700 lb casks lb.	.07½	.07½	.08½	.08½	.08½	.07½	.08½	.08
Barytes, Floated, 350 lb bbls wks ton	23.00	23.00	24.00	24.00	24.00	23.00	24.00	23.00
Bauxite, bulk, mines ton	5.00	5.00	6.00	8.00	8.00	5.00	8.00	5.00
Beeswax, Yellow, crude bags lb.	.22	.22	.24	.31	.34	.24	.37	.34
Refined, cases lb.	.26	.26	.28	.37	.38	.37	.42	.39
White, cases lb	.....	.34	.36	.36	.53	.34	.53	.51
Benzaldehyde, technical, 945 lb drums wks lb.	.60	.60	.65	.65	.65	.60	.65	.60
Benzene								
Benzene, 90%, Industrial, 8000 gal tanks wks gal.	.18	.18	.19	.21	.22	.21	.23	.23
Ind. Pure, tanks works gal.	.18	.18	.19	.21	.22	.21	.23	.23
Benzidine Base, dry, 250 lb bbls lb.	.65	.65	.67	.67	.74	.65	.74	.70
Benzoyl, Chloride, 500 lb drs lb.	.45	.45	.47	.47	1.00	.45	1.00	1.00
Benzyl, Chloride, tech drs lb.	.....	.30	.....	.30	.25	.25	.25	.25
Beta-Naphthol, 250 lb bbl wk lb.	.22	.24	.22	.24	.24	.22	.26	.22
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	1.35	1.25	1.35	1.35	1.25	1.35	1.35
Tech, 200 lb bbls lb.	.53	.58	.53	.65	.65	.53	.68	.60
Blanc Fixe, 400 lb bbls wks ton	75.00	90.00	75.00	90.00	90.00	75.00	90.00	75.00
Bleaching Powder								
Bleaching Powder, 300 lb drs c-1 wks contract 100 lb.	1.75	2.00	1.75	2.35	2.35	2.00	2.25	2.00
Blood, Dried, fob, NY Unit	1.75	1.85	1.75	3.00	3.90	3.00	4.60	3.90
Chicago Unit	1.50	1.60	1.50	2.35	4.50	2.75	5.00	4.40
S. American shipt Unit	2.20	2.25	2.20	3.20	4.10	3.15	4.70	4.25
Blues, Bronze Chinese Milori Prussian Soluble lb.	.....	.35	.....	.35	.35	.35	.35	.32
Bone, raw, Chicago ton	31.00	32.00	31.00	32.00	39.00	31.00	42.00	39.00
Bone, Ash, 100 lb kegs lb.	.06	.07	.06	.07	.07	.06	.07	.06
Black, 200 lb bbls lb.	.05½	.08½	.05½	.08½	.08½	.05½	.08½	.08½
Meal, 3% & 50%, Imp ton	.....	31.00	.....	31.00	31.00	31.00	35.00	30.00
Borax, bags lb.	.02½	.03½	.02½	.03½	.03½	02½	.03½	.02½
Bordeaux, Mixture, 16% pwd. lb.	.11½	.13	.11½	.13	.14	.12	.14	.10½
Paste, bbls lb.	.11½	.13	.11½	.13	.14	.12	.14	.10
Brazilwood, sticks, shpmt lb.	26.00	28.00	26.00	28.00	28.00	26.00	28.00	26.00
Bromine, cases lb.	.36	.43	.36	.43	.47	.38		
Bronze, Aluminum, powd blk lb.	.60	1.20	.60	1.20	1.20	.60	1.20	.60
Gold bulk lb.	.55	1.25	.55	1.25	1.25	.55	1.25	.55
Butyl, Acetate, normal drs lb.	.17	.175	.17	.175	.20	.17	.195	.184
Tank, wks lb.	.16	.175	.16	.175	.186	.16	.186	.181
Aldehyde, 50 gal drs wks lb.	.34	.44	.34	.44	.44	.34	.70	.34
Carbitol s ee Diethylene Glycol Mono (Butyl Ether)	.....	.....	.....	.....	.....	.....	.....	.....
Cellosolve (see Ethylene glycol mono butyl ether)								
Furoate, tech., 50 gal. dr., lb.	.....	.50	.....	.50	.50	.50	.50	.50
Propionate, drs lb.	.22	.25	.22	.25	.27	.22	.36	.25
Stearate, 50 gal drs lb.	.25	.30	.25	.30	.30	.25	.60	.25
Tartrate, drs lb.	.55	.60	.55	.60	.60	.55	.60	.57
Cadmium, Sulfide, boxes lb.	.65	.90	.65	.90	1.75	.90	1.75	.75
Calcium								
Calcium, Acetate, 150 lb bags c-1 100 lb.	.....	2.00	.....	2.00	4.50	2.00	4.50	4.50
Arsenate, 100 lb bbls c-1 wks lb.	.07	.09	.07	.09	.09	.07	.09	.07
Carbide, drs lb.	.05	.06	.05	.06	.06	.05	.06	.05
Carbonate, tech, 100 lb bags c-1 lb.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks ton	.....	22.75	.....	22.75	22.75	22.75	25.00	22.75
Solid, 650 lb drs c-1 fob wks ton	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Nitrate, 100 lb bags ton	40.00	43.00	40.00	43.00	43.00	40.00	52.00	42.00
Peroxide, 100 lb. drs lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Phosphate, tech, 450 lb bbls lb.	.08	.08¼	.08	.08¼	.08¼	.08	.08	.07
Stearate, 100 lb bbls lb.	.18	.22	.18	.22	.26	.19	.26	.25
Calurea, bags S. points. c.i.f. ton	.....	88.65	.....	88.65	88.65	88.65	88.15	82.15
Camwood, Bark, ground bbls. lb.	.....	.18	.....	.18	.18	.18	.18	.18
Candelilla Wax, bags lb.	.14	.14½	.13	.15	.20	.15	.24	.22
Carbitol, (See Diethylene Gycol Mono Ethyl Ether)	.....	.....	.....	.....	.....	.....	.....	.....
Carbon, Decolorizing, 40 lb bags c-1 lb.	.08	.08	.15	.15	.15	.08	.15	.08
Black, 100-300 lb cases 1c-1 NY lb.	.06	.06	.12	.12	.12	.06	.12	.12
Bisulfide, 500 lb drs 1c-1 NY lb.	.05½	.05½	.06	.06	.06	.05½	.06	.05½
Dioxide, Liq. 20-25 lb cyl lb.	.....	.06	.....	.06	.18	.06	.06	.06
Tetrachloride, 1400 lb drs delivered lb.	.06½	.06½	.07	.07	.07	.06½	.07½	.06½
Carnauba Wax, Flor, bags lb.	.26	.26	.28	.28	.37	.28	.43	.35
No. 1 Yellow, bags lb.	.31½	.23	.33	.40	.33	.25	.40	.33
No. 2 N Country, bags lb.	.....	.17¾	.17¾	.23	.27	.20	.32	.28
No. 2 Regular, bags lb.	.30	.21	.31	.23	.30	.23	.36	.31
No. 3 N. C. lb.	.13½	.14¼	.13½	.16	.23	.16	.25	.24
No. 3 Chalky lb.	.13½	.13½	.15	.15½	.23	.16	.26	.24
Casein, Standard, Domestic ground lb.	.06	.06	.07	.10	.15½	09½	.17	.15

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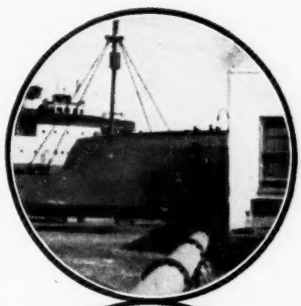
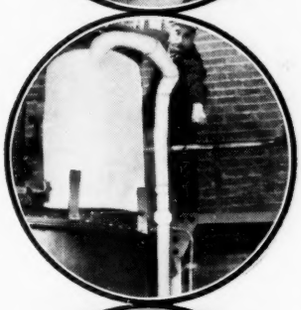
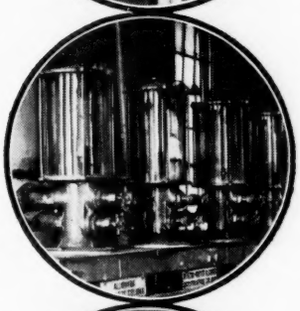
Four company-owned steamers deliver raw material direct to plant.



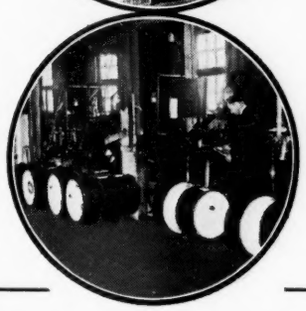
Special distillation process calling for absolute accuracy in control.



Tail box assembly in the anhydrous alcohol plant.



Filling room for drum shipments of solvent chemicals.



ANHYDROUS ALCOHOL

(Pure and Denatured Ethyl Alcohol)

(C_2H_5OH—99.8-100%)

SPECIFICATIONS

Color & Properties:
Clear, water-white liquid, characteristic odor

Constants:* *(for pure alcohol)*
Specific gravity: Not more than 0.7940 at 60/60 °F.
Weight per Gallon: 6.62 pounds
Acidity: Free acid as acetic, not over 0.02%
Boiling Point: 78.4 °C.

**Constants for Denatured Anhydrous Alcohol will naturally vary with the quantity and character of the denaturants but will approximate the above.*

Solubility:
Miscible with water without turbidity

Dryness:
When 10cc. of the alcohol is shaken in a stoppered tube with 0.5 gm. anhydrous copper sulphate, the latter does not turn blue.

Derivation:
Removal of water from ordinary 95% alcohol by a continuous process

Method of Purification:
Distillation

Grades:
Pure and Denatured (all formulae)

Containers:
Tank cars, 50-, 10- and 5-gallon steel or tin-lined drums, ½-litre bottles—36 to the case

Fire Hazards:
Alcohol is inflammable, having a flash point below 80° F. Precautions should be taken to keep flames away from its vapors

PIONEERED by the U. S. Industrial Chemical Co., Inc., anhydrous alcohol is a basic ingredient in certain types of modern lacquers. It is an excellent solvent for most resins. Nitrocellulose solutions made up with anhydrous alcohol are of low viscosity, will stand considerable dilution with hydrocarbons and have little action on the usual priming coats.

In the hat-making industry, heat, high humidity and difficult ventilating conditions are frequently met with. Nitrocellulose sizings containing anhydrous alcohol on account of mild odor, blush resistance and low viscosity, enjoy a good standing in this trade.

Many varnish gums dissolve directly in anhydrous alcohol, others after heat treatment and addition of small percentage of ester and hydrocarbons.

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WORLD'S OLDEST AND LARGEST MANUFACTURER OF ALCOHOL CHEMICALS

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Amyl Acetate. Butyl Acetate. Ethyl Acetate. Ethyl Chloro Carbonate. Ether.

• DIVISION OF U. S. INDUSTRIAL ALCOHOL CO. •

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

$20,811; and Japan, 159,803 pounds, $17,015.

Camphor — The market for this commodity went through a very quiet period during the past month. Industries which are large consumers have been restricting consumption very materially, but prices have held fairly steady. Imports of camphor into the United States were considerably lower in 1930 than those of preceding year. The following statistics indicate imports of camphor into the United States during 1929 and 1930 (quantities in pounds):

	1929	*1930*	*Jan.-June 1931*
Natural, crude	4,204,000	1,058,000	743,000
Natural, refined	1,431,000	1,032,000	687,000
Synthetic	3,957,000	2,405,000	1,055,000

The yearly average of importations during the past five years is as follows: Natural, crude 2,680,000 pounds; natural, refined, 1,215,000 pounds; Synthetic, 2, 657,000 pounds.

Carbon Black — Some improvement in the price structure of this commodity is not unlikely in the event that the rubber companies extend their schedules appreciably.

Carbon Tetrachloride — Sales to bottlers for resale were satisfactory. Other lines were taking material only as actually needed. Prices were unchanged.

Carnauba Wax — A slight buying flurry at the end of the month sent this commodity to higher prices, No. 1 being quoted at 31½c and No. 2 at 30c. With stocks in the hands of importers considerably below the normal supply any increased demand is immediately reflected in the price structure.

Chlorine — Seasonal demand from some outlets tended to strengthen an otherwise dull market. Shipments into the textile centers were better. Prices were firm and unaltered. Speculation was rife on what course the market would take in the coming contract season. Prices are thought in most quarters to be very close to production costs specially the tank-car figure.

Copperas — No change has taken place in the situation which has prevailed for some months past. Decline in steel mill operations has seriously reduced stocks of copperas and producers are said to be rationing out material to consumers. As yet no change has been made in the price structure.

Copper Sulfate — The agricultural season in this country closed last month and from the tonnage viewpoint was a very satisfactory one. Already orders from South America are coming in in large volume and leading producers look forward to a successful season in that quarter. Prices held at firm levels during the month

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Cellosolve (see Ethylene glycol mono ethyl ether)							
Acetate (see Ethylene glycol mono ethyl ether acetate)							
Celluloid, Scraps, Ivory cs. lb.	.13	.15	.13	.15	.20	.20	.30	.20
Shell, cases lb.	.18	.20	.18	.20	.20	.18	.20	.18
Transparent, cases lb.	.....	.15	.....	.15	.15	.15	.32	.15
Cellulose, Acetate, 50 lb kegs lb.	.80	1.25	.80	1.25	1.25	.80	1.25	1.20
Chalk, dropped, 175 lb bbls lb.	.03	.03½	.03	.03½	.03½	.03	.03½	.03
Precip, heavy, 560 lb cks lb.	.02	.03½	.02	.03½	.03½	.02	.03½	.02
Light, 250 lb casks lb.	.02½	.03½	.02½	.03½	.03½	.02½	.03½	.02½
Charcoal, Hardwood, lump, bulk wks bu.	.18	.19	.18	.19	.19	.18	.19	.18
Willow, powd, 100 lb bbl wks lb.	.06	.06½	.06	.06½	.06½	.06	.06½	.06
Wood, powd, 100 lb bbls lb.	.04	.05	.04	.05	.05	04	.05	.04
Chestnut, clarified bbls wks, lb.	.02	.03	.02	.03	.03	.02½	.02	.03½
25% tks wks lb.	.01½	.02½	.01½	.02½	.02½	.01½	.02½	.01½
Powd, 60%, 100 lb bgs wks lb.	.....	.04½	.....	.04½	.04½	.04½	.04 4/8	.04½
Powd, decolorized bgs wks lb.	.05½	.06	.05½	.06	.06	.05½	.06	.05½
China Clay, lump, blk mines ton	8.00	9.00	8.00	9.00	9.00	8.00	9.00	8.00
Powdered, bbls lb.	.01½	.02	.01½	.02	.02	.01½	.02	.01½
Pulverized, bbls wks ton	10.00	12.00	10.00	12.00	12.00	10.00	12.00	10.00
Imported, lump, bulk ton	15.00	25.00	15.00	25.00	25.00	15.00	25.00	15.00
Powdered, bbls lb.	.01½	.03	.01½	.03	.03	.01½	.03½	.01½
Chlorine								
Chlorine, cyls 1c-1 wks contract lb.	.07	.08½	.07	.08½	.08½	.07	.08½	.07
cyls, cl wks, contract lb.	.04	.04½	.04	.04½	.04½	.04	.04½	.04½
Liq tank or multi-car lot cyls wks contract lb.	.01½	.02½	.01½	.02½	.025	.01½	.03	.025
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks lb.	.10	.10½	.10	.10½	.10½	.10	.10½	.08½
Chloroform, tech, 1000 lb drs lb.	.15	.16	.15	.16	.16	.15	.20	.16
Chloropicrin, comml cyls lb.	1.00	1.35	1.00	1.35	1.35	1.00	1.35	1.00
Chrome, Green, CP lb.	.26	.29	.26	.29	.29	.26	.29	.26
Commercial lb.	.06½	.11	.06½	.11	.11	.06½	.11	.06½
Yellow lb.	.16	.18	.16	.18	.18	.16	.18	.15
Chromium, Acetate, 8% Chrome bbls lb.	.04½	.05½	.04½	.05½	.05½	.04½	.05½	.04½
20° soln, 400 lb bbls lb.	.....	.05½	.....	.05½	.05½	.05½	.05½	.05½
Fluoride, powd, 400 lb bbl lb.	.27	.28	.27	.28	.28	.27	.28	.27
Oxide, green, bbls lb.	.34½	.35½	.34½	.35½	.35½	.34½	.35½	.34½
Coal tar, bbls bbl	10.00	10.50	10.00	10.50	10.50	10.00	10.50	10.00
Cobalt Oxide, black, bags lb.	1.35	1.45	1.35	2.22	2.22	2.10	2.22	2.10
Cochineal, gray or black bag lb.	.52	.57	.52	.57	1.01	.52	1.01	.95
Teneriffe silver, bags lb.	.....	.57	.55	.57	.95	.54	.95	.95
Copper								
Copper, metal, electrol 100 lb.	7.50	8.00	7.50	10.36	17.78	9.50	24.00	17.00
Carbonate, 400 lb bbls lb.	.08½	.16½	.08½	.16½	.21½	.08½	.25	.13
Chloride, 250 lb bbls lb.	.22	.25	.22	.25	.28	.22	.28	.25
Cyanide, 100 lb drs lb.	.41	.42	.41	.42	.45	.41	.60	.44
Oxide, red, 100 lb bbls lb.	.15½	.18	.15½	.18	.32	.15½	.32	.16½
Sub-acetate verdigris, 400 lb bbls lb.	.18	.19	.18	.19	.19	.18	.19	.18
Sulfate, bbls c-1 wks 100 lb.	.....	3.60	3.60	4.95	5.50	3.95	7.00	5.50
Copperas, crys and sugar bulk c-1 wks ton	13.00	14.00	13.00	14.00	14.00	13.00	14.00	13.00
Cotton, Soluble, wet, 100 lb bbls lb.	.40	.42	.40	.42	.42	.40	.42	.40
Cottonseed, S. E. bulk c-1 ton	.....	26.50	.....	26.50	.....	.....	.....	.....
Meal S. E. bulk ton	.....	.....	.....	.....	.....	.....	.....	.....
7% Amm., bags mills ton	37.50	38.00	37.50	38.00	38.00	37.50	38.00	37.50
Cream Tartar, USP, 300 lb. bbls lb.	.....	.22½	.22¾	.24½	.27	.24½	.28	26½
Creosote, USP, 42 lb cbys lb.	.40	.42	.40	.42	.42	.40	.42	.40½
Oil, Grade 1 tanks gal.	.13	.14	.13	.14	.16	.15	.19	.15
Grade 2 gal.	.11	.12	.11	.12	.14	.13	.23	.13
Grade 3 gal.	.11	.12	.11	.12	.14	.13	.28	.13
Cresol, USP, drums lb.	.12½	.16	.12½	.17	.17	.14	.17	.14
Crotonaldehyde, 50 gal dr lb.	.32	.36	.32	.36	.36	.32	.36	.32
Cudbear, English lb.	.16	.17	.16	.17	.17	.16	.17	.16
Cutch, Rangoon, 100 lb bales lb.	.11	.13	.11	.13	.13	.11	.16	.12½
Borneo, Solid, 100 lb bale lb.	.06½	08½	.06½	.08½	.08½	.06½	.08½	.08
Cyanamide, bulk c-1 wks Nitrogen unit	.....	1.10	1.10	1.64	2.00	1.70	2.00	2.00
Dextrin, corn, 140 lb bags 100 lb.	.....	3.72	3.47	4.02	4.82	4.42	4.92	4.62
White, 140 lb bags 100 lb.	3.42	3.67	3.42	4.02	4.77	4.17	4.87	4.57
Potato, Yellow, 220 lb bgs lb.	.08	.09	.08	.09	.09	.08	.09	.08
White, 220 lb bags 1c-1 lb.	.08	.09	.08	.09	.09	.08	.09	.08
Tapioca, 200 lb bags 1c-1 lb.	.08½	.08¾	.08¼	.08¾	.08¼	.08	.08½	.08
Diamylphthalate, drs wks gal.	.....	3.80	.....	3.80	3.80	3.80	3.80	3.80
Dianisidine, barrels lb.	2.35	2.70	2.35	2.70	2.70	2.35	3.10	2.70
Dibutylphthalate, wks lb.	.24½	.28	.24½	.28	.28	.24½	.26½	.26½
Dibutyltartrate, 50 gal drs lb.	.29½	.31½	.29½	.31½	.31½	.29½	.31½	.29½
Dichloroethylether, 50 gal drs lb.	.....	.06	.....	.06	.07	.05	.13	.05
Dichloromethane, drs wks lb.	.55	.65	.55	.65	.65	.55	.65	.55
Diethylamine, 400 lb drs lb.	2.75	3.00	2.75	3.00	3.00	2.75	3.00	2.75
Diethylcarbonate, drs gal.	1.85	1.90	1.85	1.90	1.90	1.85	1.90	1.85
Diethylaniline, 850 lb drs lb.	.55	.60	.55	.60	.60	.55	.60	.55
Diethyleneglycol, drs lb.	.14	.16	.14	.16	.13	.10	.13	.10
Mono ethyl ether, drs lb.	.....	.16	.....	.16	.16	.13	.15	.13
Mono butyl ether, drs lb.	.24	.30	.24	.30	.30	.24	.30	.25
Diethylene oxide, 50 gal dr lb.	.....	.50	.....	.50	.50	.50	.50	.50
Diethylorthotoluidin, drs lb.	.64	.67	.64	.67	.67	.64	.67	.64
Diethyl phthalate, 1000 lb drums lb.	.24	.26	.24	.26	.26	.24	.26	.24
Diethylsulfate, technical, 50 gal drums lb.	.30	.35	.30	.35	.35	.30	.35	.30
Dimethylamine, 400 lb drs lb.	.....	2.62	.....	2.62	2.62	2.62	2.62	2.62
Dimethylaniline, 340 lb drs lb.	.25	.27	.25	.28	.28	.26	.32	.26

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

as the metal fluctuated in very narrow limits. While the latest metal stock figures show a slight gain in tonnage it was not sufficient to affect prices further and with a number of producers arranging for further curtailment or complete shutdowns there is little liklihood of the metal going much lower. Consequently it would seem that present sulfate prices are very attractive to buyers. Imports of copper sulfate into the United States during 1930 were 2,982 short tons compared with 2,694 tons in 1929. Germany was the largest source of supply with Belgium, United Kingdom, and Canada sending relatively small quantities. During 1929 the imports by customs districts were 943 tons to San Francisco, 469 tons to Los Angeles, 199 tons to Oregon, 34 tons to Washington, and 558 tons to Florida.

Casein — Domestic and imported prices have not been openly changed, but sizable orders are being put through at lower prices. The outlook continues to be discouraging.

Copper — The metal market fluctuated within the rather narrow limits of 7½ and 8c. There is little liklihood of improvement in the market for some months with stocks on hand showing no indication of decreasing.

Cream of Tartar — This item went into new low ground on Aug. 21 when domestic producers announced a price of 22¼c.

Cresylic Acid — Consumption in the disinfectant line was smaller as the major season for that trade came near to its close. Improved inquiry was noted from the textile centers, but in all cases buyers were limiting purchases strictly to immediate needs.

Dextrin — A rather encouraging sign was the increased demand from the textile centers.

Starch — The market passed through a quiet period with prices fairly steady against a reduced demand from most quarters other than the textile.

Dry Colors — The month of August was perhaps the poorest this trade has experienced in several years. Competition for the restricted tonnages was specially keen and prices on a large number of items were shaded.

Dyestuffs — Demand from the textile centers continued to feature the market. Sales to the tanning industry however fell off during August. Prices showed very little change. Considerable interest was noticeable in the absorption of Newport by du Pont. Imports of synthetic dyes during July totaled 356,106 pounds and were valued at $307,350, it is reported by the Department of Commerce and the

	Current Market		1931		1930		1929	
			Low	High	High	Low	High	Low
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.50	.45	50	.45
Dinitrobenzene, 400 lb bbls...lb.	.15	.16	.15	.16½	.16½	.15½	.16½	.15
Dintrochlorobenzene, 400 lb bbls.....lb.	.13	.15	.13	.15	.15	.13	.15	.1
Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.34	.37	.37	.34	.37	.34
Dinitrophenol, 350 lb bbls....lb.	.29	.30	.29	.30	.32	.31	.32	.31
Dinitrotoluene, 300 lb bbls...lb.	.16	.17	.16	.17	.18	.16	.19	.17
Diorthotolyguanidine, 275 lb bbls wks.....lb.	.42	.46	.42	.46	.46	.42	.49	.42
Dioxan (See Diethylene Oxide)	.....	.....	.....	.....	.....	.....	.....	.....
Diphenyl.....lb.	.20	40	.20	.40	.50	.20	.50	.40
Diphenylamine.....lb.	.37	.38	.37	.38	.40	.38	.47	.40
Diphenylguanidine, 100 lb bbl lb.	.30	.35	.30	.35	.35	.30	.40	.30
Dip Oil, 25%, drums.....lb.	.26	.30	.26	.30	.30	.26	.30	.26
Divi Divi pods, bgs shipmt..ton	30.00	32.00	28.00	35.00	46.50	35.00	57.00	46.50
Extract.....lb.	.05	.05½	.05	.05½	.05½	.05	.05½	.05
Egg Yolk, 200 lb cases.....lb.	.46	.47	.45	.58	.80	.72	.84	.77
Epsom Salt, tech, 300 lb bbls c-1 NY.....100 lb.	1.70	1.90	1.70	1.90	1.90	1.70	1.90	1.70
Ether, USP anaesthesia 55 lb. drs. .....lb.	.....	.23	.23	.28	.28	.21	.39	.38
USP (Conc.).....lb.	.09	.10	.09	.10	.....	.....	.....	.....
Ethyl Acetate, 85% Ester, tanks.....lb.	.....	.08	.08	.088	.115	.085	.122	.108
drums.....lb.	.09	.095	.09	.10	.158	.094	.129	.111
Anhydrous, tanks.....lb.	.....	.119	.....	.119	.142	.119		
drums.....lb.	.115	.121	.115	.121	.156	.115		
Acetoacetate, 50 gal drs....lb.	.65	.68	.65	.68	.68	.65	.68	.65
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	1.11	.88	1.11	1.05
Bromide, tech, drums .....lb.	.50	.55	.50	.55	.55	.50	.55	.50
Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.85	1.90	1.90	1.85	1.90	1.85
Chloride, 200 lb. drums....lb.	.....	.22	.....	.22	.22	.22	.22	.22
Chlorocarbonate, cbys.....lb.	.....	.30	.....	.30	.40	.30	.40	.35
Ether, Absolute, 50 gal drs..lb.	.50	.52	.50	.52	.52	.50	.52	.50
Furoate, 1 lb tins .....lb.	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Lactate, drums works.....lb.	.25	.29	.25	.29	.29	.25	.35	.25
Methyl Ketone, 50 gal drs..lb.	.....	.30	.....	.30	.30	.30	.30	.30
Oxalate, drums works.....lb.	.45	.55	.45	.55	.55	.45	.55	.45
Oxybutyrate, 50 gal drs wks.lb.	.....	.30½	.....	.30½	.30½	.30½	.36	.30
Ethylene Dibromide, 60 lb dr .lb.	.....	.70	.....	.70	.70	.70	.70	.79
Chlorhydrin, 40%, 10 gal cbys. chloro. cont.....lb.	.75	.85	.75	.85	.85	.75	.85	.75
Dichloride, 50 gal drums...lb.	.05	.07	.05	.07	.07	.05	.10	.05
Glycol, 50 gal drs wks.....lb.	.25	.28	.25	.28	.28	.25	30	.25
Mono Butyl Ether drs wks.	.25	.27	.25	.27	.27	.23	.31	.23
Mono Ethyl Ether drs wks	.17	.20	.17	.20	.20	.16	.24	.16
Mono Ethyl Ether Acetate dr. wks.....	.19½	.23	.19½	.23	.23	.19	.26	.19
Mono Methyl Ether, drs.lb.	.21	.23	.21	.23	.23	.19	.23	.19
Stearate.....lb.	.18	.18	.18	.18	.....	.....	.....	.....
Oxide, cyl.....lb.	.....	2.00	.....	2.00	2.00	2.00		
Ethylidenaniline.....lb.	.45	.47½	.45	.47½	.47½	.45	.65	.45
Feldspar, bulk.....ton	15.00	20.00	15.00	20.00	25.00	15.00	25.00	20.00
Powdered, bulk works.....ton	15.00	21.00	15.00	21.00	21.00	15.00	21.00	15.00
Ferric Chloride, tech, crystal 475 lb bbls.....lb.	.05	.07½	.05	.07½	.07½	.05	.09	.05
Fish Scrap, dried, wks.....unit	.....	3.00&10	3.00&10	4.25&10	4.35&10	3.90&10	4.25&10	3.65&10
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	3.50&50	.....	3.50&50	3.50&50	3.20&50	4.00&50	3.50&50
Fluorspar, 98%, bags.....	41.00	46.00	41.00	46.00	46.00	41.00	46.00	41.00
Formaldehyde								
Formaldehyde, aniline, 100 lb. drums.....lb.	.....	.....	.....	.....	.....	.....	.....	.....
USP, 400 lb bbls wks.....lb.	.37½	.42	.37½	.42	.42	.37½	.42	.37
Fossil Flour.....lb.	.06	.07½	.06	.07½	.08	.06	.10	.08½
Fullers Earth, bulk, mines..ton	.02½	.04	.02½	.04	.04	.02½	.04	.02½
Imp. powd 5-1 bags.....ton	15.00	20.00	15.00	20.00	20.00	15.00	20.00	15.00
Furfural (tech.) drums, wks..lb.	24.00	30.00	24.00	30.00	30.00	24.00	30.00	25.00
Furfuramide (tech) 100 lb dr..lb.	.....	.10	.....	.10	.15	.10	.19½	.17
Furfuryl Acetate, 1 lb tins....lb.	.....	.30	.....	.30	.30	.30	.30	.30
Alcohol, (tech) 100 lb dr....lb.	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Furoic Acid (tech) 100 lb dr...lb.	.....	.50	.....	.50	.50	.50	.50	.50
Fusel Oil, 10% impurities ...gal.	.....	.50	.....	.50	.50	.50	1.00	.50
Fustic, chips.....lb.	.. ..	1.35	.....	1.35	1.35	1.35	1.35	1.35
Crystals, 100 lb boxes.....lb.	.04	.05	.04	.05	.05	.04	.05	.04
Liquid, 50°, 600 lb bbls....lb.	.20	.22	.20	.22	.22	.20	.22	.20
Solid, 50 lb boxes.....lb.	.09	10	.09	.10	.10	.09	.10	.09
Sticks.....ton	.14	.16	.14	.16	.16	.14	.16	.14
G Salt paste, 360 lb bbls.....lb.	25.00	26.00	25.00	26.00	26.00	25.00	26.00	25.00
Gall Extract.....lb.	.45	.50	.45	.50	.50	.45	.52	.45
Gambier, common 200 lb cs...lb.	.18	.20	.18	.20	.20	.18	.21	.18
25% liquid, 450 lb bbls....lb.	.....	.07	.06½	.07	.07	.06	.07	06
Singapore cubes, 150 lb bg..lb.	08	10	.08	.10	.10	.08	.14	.08
Gelatin, tech, 100 lb cases....lb.	.09½	.09	.09½	.09	.09	.08½	.09	.08½
Glauber's Salt, tech, c-1 wks.....100 lb.	.45	.50	.45	.50	.50	.45	.50	.45
Glucose (grape sugar) dry 70-80° bags c-1 NY.....100 lb.	1.00	1.70	1.00	1.70	1.70	1.00	1.70	.70
Tanner's Special, 100 lb bags .....100 lb.	3.24	3.34	3.24	3.34	3.34	3.24	3.34	3.20
Glue, medium white, bbls...lb.	.....	3.14	.....	3.14	3.14	3.14	3.14	3.14
Pure white, bbls.....lb.	.22	.24	.22	.24	.24	.20	.24	.20
Glycerin, CP, 550 lb drs.....lb.	.25	.26	.25	.26	.26	.22	.26	.22
Dynamite, 100 lb drs.....lb.	.....	.11½	.11½	.14½	.14½	.12½	.16	.13½
Saponification, tanks.....lb.	.....	.09½	.09½	.12½	.12½	.11	.12½	.10½
Soap Lye, tanks.....lb.	.....	.06½	.06½	.07½	.08	.07½	.08½	.07½
Graphite, crude, 220 lb bgs...ton	.....	.05½	.05½	.07	.07½	.06¾	.07½	.06¾
Flake, 500 lb bbls.....lb.	15.00	35.00	15.00	35.00	35.00	15.00	35.00	15.00
	.06	09	.06	.09	.09	.06	.09	06
Gums								
Gum Accroides, Red, coarse and fine 140-150 lb bags.....lb.	.03¾	.04½	.03¾	.04½	.04½	.03¾	.04½	.03
Powd, 150 lb bags .....lb.	.06	.06½	.06	.06½	.06½	.06	.06½	.06¾

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Bicarbonate of Soda

Sal Soda

Monohydrate of Soda

Standard Quality

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

United States Tariff Commission. These figures compare with 151,233 pounds, with a value of $131,511, imported during the same month last year. A total of 2,785,721 pounds, valued at $2,420,973, has come into the country during the first seven months of 1931; while the total for the same period last year was 2,346,788 pounds, value $1,970,928.

Countries of Origin

	Percentages	
	July 1931	*July 1930*
Germany	64.45	47.93
Switzerland	34.22	46.72
England	1.17	5.13
Other countries	.16	.22

Imports by Ports

	July, 1931	
	Pounds	*Invoice value*
New York	351,925	$302,957
Boston	4,181	4,393

Leading Dyes in July Imports

	Pounds
Vat golden yellow GK double paste (single strength)	29,000
Ciba brown G paste	26,742
Vat blue green FFB double paste (single strength)	14,384
Vat printing black B paste	8,450
Brilliant indigo 4B	7,074

Aromatic chemicals imported during July totaled 5,107 pounds and were valued at $6,915, compared with 7,088 pounds, with a value of $8,991, imported during July, 1930. Imports in the first seven months of this year have amounted to 31.148 pounds, with a value of $46,868. Imports in the corresponding period of last year were 84,006 pounds, valued at $133,988.

Ether — Sales for industrial purposes were considerably below the level for the same period a year ago. The competitive position is such that it is unlikely that an advance will be made in the near future from the extremely low levels prevailing.

Fish Scrap — Despite a smaller demand than in previous years, makers of scrap are holding the market at $3 and 10 per unit-ton for the dried unground, factory. Fishing results are understood to have improved recently. Fish meal is offered at $50.50 to $51 per ton, Baltimore factory, and wet acidulated at $2.40 and 50 per unit.

Glycerine — A slightly better tone was in evidence in the last week or so of the month due to improvement in the volume of actual shipments and a stiffening of prices. Already producers were beginning to note inquiries on anti-freeze business and a decided betterment in actual tonnage should begin to make itself felt shortly. Stocks of c.p. material were said to be less than commonly suspected.

Japan Wax — Prices went to new low ground when several factors quoted 8¼c. In some instances it was reported that shading from this figure was possible on worthwhile orders.

Lead — Prices of the metal remained quite firm during August despite sales of

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Yellow, 150-200 lb bags	lb.	.18	.18	.20	.20	.18	.20	.18
Animi (Zanzibar) bean & pea 250 lb cases	lb.	.35	.35	.40	.40	.35	.40	.35
Glassy, 250 lb cases	lb.	.50	.50	.55	.55	.50	.55	.50
Asphaltum, Barbadoes (Manjak) 200 lb bags	lb.	.09	.09	.12	.12	.09	.12	.09
Egyptian, 200 lb cases	lb.	.15	.15	.17	.17	.15	.17	.15
Gilsonite Selects, 200 lb bags	ton	58.00	58.00	65.00	65.00	58.00	65.00	58.00
Damar Batavia standard 136, lb cases	lb.	.09½	.09¼	.13	.20	.14	.26	.22
Batavia Dust, 160 lb bags	lb.	.05	.05½	.05¼	.06	.11	.06	.11	.10½
E Seeds, 136 lb cases	lb.	.06	.06½	.07	.08	.13	.08	.17½	.15
F Splinters, 136 lb cases and bags	lb.	.05½	.06	.06½	.07½	.13½	.07	.13½	.13
Singapore, No 1, 224 lb cases	lb.	.14	.15	.13½	.15	.24	.18½	.30½	.26
No. 2, 224 lb cases	lb.	.08	.08½	.08½	.10	.20½	.13	.24	.21½
No. 3, 180 lb bags	lb.	.04½	.05	.05	.06	.11½	.07	.14	.10
Benzoin Sumatra, U. S. P. 120 lb cases	lb.	.28	.30	.28	.34	.40	.33	.40	.38
Copal Congo, 112 lb bags, clean opaque	lb.	.16½	.17	.16	.17	.17	.16	.17	.14
Dark, amber	lb.	.06	.07	.06½	.07½	.08	.07¼	.09	.08½
Light, amber	lb.	.12½	.14	.12½	.14	.14	.12½	.14	.12½
Water white	lb.	.37	.45	.37	.45	.45	.37	.36	.35
Mastic	lb.	.50	.52	.48	.58	.65	.57	.65	.58
Manila, 180-190 lb baskets									
Loba A	lb.	.10	.11	.11	.13	.17½	.13	.17½	.17
Loba B	lb.	.08	.08½	.09	.10½	.16½	.13½	.16½	.15½
Loba C	lb.	.07½	.08	.08½	.10	.14	.10	.14½	.13½
M A Sorts	lb.	.05	.05½	.05½	.06½	.....	.....	.....	.....
D B B Chips	lb.	.06	.06½	.07	.08	.....	.....	.....	.....
East Indies chips, 180 lb bags	lb.	.05	.05½	.05	.05½	.11	.09	.11	.10
Pale bold, 224 lb cs	lb.	.15½	.16	.15½	.16	.21	.17½	.21	.20
Pale nubs, 180 lb bags	lb.	.08	.08½	.08	.09	.16	.12½	.16	15
Pontianak, 224 lb cases									
Bold gen No 1	lb.	.15½	.16	.16	.17	.21	.19	.23	.20
Gen chips spot	lb.	.07	.08	.07	.08½	.15	.13½	.15	.14½
Elemi, No. 1, 80-85 lb cs	lb.	.09	.09½	.10	.12	.14	.12½	.14	.13½
No. 2, 80-85 lb cases	lb.	.08½	.09	.09½	.11½	.13½	.12	.13½	.13
No. 3, 80-85 lb cases	lb.	.08	.08½	.08½	.11	.13	.11	.13	.12
Kauri, 224-226 lb cases No. 1		.42	.48	.43	.50	.57	.48	.57	.50
No. 2 fair pale	lb.	.24	.25	.26	.29	.38	.32	.38	.35
Brown Chips, 224-226 lb cases	lb.	.10	.12	.10	.12	.12	.10	.12	.10
Bush Chips, 224-226 lb. cases	lb.	.26	.28	.28	.34	.40	.38	.40	.38
Pale Chips, 224-226 lb cases	lb.	.19	.21	.19	.22	.26	.24½	.26	.24½
Sandarac, prime quality, 200 lb bags & 300 lb casks	lb.	.18	.20	.18	.22	.40	.27	.72	.35
Helium, 1 lit. bot.	lit.	.....	25.00	.....	25.00	25.00	25.00	.20	.17
Hematine crystals, 400 lb bbls	lb.	.14	.18	.14	.18	.18	.14	.20	.14
Paste, 500 bbls	lb.	.....	.11	.....	.11	.11	.11	.11	.11
Hemlock 25%, 600 lb bbls wks	lb.	.03	.03½	.03	.03½	.03½	.03	.03¼	.03
Bark	ton	.....	16.00	.....	16.00	16.00	16.00	17.00	16.00
Hexalene, 50 gal drs wks	lb.	.....	.60	.....	.60	.60	.60	.60	.60
Hexamethylenetetramine, drs	lb.	.46	.50	.46	.50	.50	.46	.58	.48
Hoof Meal, fob Chicago	unit	.....	2.50	.....	2.50	3.75	2.50	4.00	3.75
South Amer. to arrive	unit	.....	2.70	.....	2.70	3.75	2.70	3.90	3.75
Hydrogen Peroxide, 100 vol, 140 lb cbys	lb.	.21	.24	.21	.24	.26	.21	.26	.24
Hydroxyamine Hydrochloride	lb.	.....	3.15	.....	3.15	3.15	3.15		
Hypernic, 51°, 600 lb bbls	lb.	.12	.15	.12	.15	.15	.12	.15	.12
Indigo Madras, bbls	lb.	1.28	1.30	1.28	1.30	1.30	1.28	1.30	1.28
20% paste, drums	lb.	.15	.18	.15	.18	.18	.15	.18	.15
Synthetic, liquid	lb.	.....	.12	.....	.12	.12	.12	.12	.12
Iron Chloride, see Ferric or Ferrous									
Iron Nitrate, kegs	lb.	.09	.10	.09	.10	.10	.09	.10	.09
Coml, bbls	100 lb.	2.50	3.25	2.50	3.25	3.25	2.50	3.25	2.50
Oxide, English	lb.	.10	.12	.10	.12	.12	.10	.12	.10
Red, Spanish	lb.	.02½	.03¼	.02½	.03¼	.03¼	.02½	.03¼	.02½
Isopropyl Acetate, 50 gal drs	gal.	.85	.90	.85	.90	.90	.85	.90	.85
Japan Wax, 224 lb cases	lb.	.09	10	.09	.11	.15½	.11½	.18	.16
Kieselguhr, 95 lb bgs NY									
Brown	ton	60.00	70.00	60.00	70.00	70.00	60.00	70.00	60.00
Lead Acetate, bbls wks	100 lb.	9.50	10.00	9.50	11.00	13.50	10.50	13.50	13.00
White crystals, 500 lb bbls wks	100 lb.	.....	11.00	10.50	12.25	14.50	11.50	14.50	14.00
Arsenate, drs 1c-1 wks	lb.	.11	.13	.11	.14	.16	.13	.15	.13
Dithiofuroate, 100 lb dr	lb.	.....	1.00	.....	1.00	1.00	1.00		
Metal, c-l NY	100 lb.	.....	4.40	3.75	4.60	7.75	5.10	7.75	6.10
Nitrate, 500 lb bbls wks	lb.	.13	.14	.13	.14	.14	.13	.14	.14
Oleate, bbls	lb.	.17½	.18	.17½	.18	.18	.17½	.18	.17½
Oxide Litharge, 500 lb bbls	lb.	.07½	.08	.07½	.08	.08¼	.08½	.08¼	.08¼
Red, 500 lb bbls wks	lb.	.07½	.08½	.07½	.08¼	.09¼	.08½	.09¼	.09¼
White, 500 lb bbls wks	lb.	.07½	.08	.07½	.08	.09½	.07½	.09½	.09
Sulfate, 500 lb bbls wk	lb.	.06½	.07	.06½	.07	.08½	.06½	.08¼	.08½
Leuna saltpetre, bags c.i.f.	ton	.....	57.60	.....	57.60	57.60	57.60	57.00	52.00
S. points c. i. f.	ton	.....	57.90	.....	57.90	57.90	57.90	57.30	52.30
Lime, ground stone bags	ton	.....	4.50	.....	4.50	4.50	4.50	4.50	4.50
Live, 325 lb bbls wks	100 lb.	.....	1.05	.....	1.05	1.05	1.05	1.05	1.05
Lime Salts, see Calcium Salts									
Lime-Sulfur soln bbls	gal.	.15	.17	.15	.17	.17	.15	.17	.15
Lithopone, 400 lb bbls 1c-1 wks	lb.	.04½	.05	.04¼	.05	.05½	.04½	.06½	.05½
Logwood, 51°, 600 lb bbls	lb.	.07	.08	.07	.08	.08½	.07	.08½	.08½
Chips, 150 lb bags	lb.	.03	.03½	.03	.03½	.03½	.03	.03½	.03
Solid, 50 lb boxes	lb.	.12	.12½	.12	.12½	.12½	.12½	.12½	.12½
Sticks	ton	24.00	26.00	24.00	26.00	26.00	24.00	26.00	24.00
Lower grades	lb.	.07½	.08	.07½	.08	.08	.07½	.08	.07½
Madder, Dutch	lb.	.22	.25	.22	.25	.25	.22	.25	.22
Magnesite, calc, 500 lb bbl	ton	50.00	60.00	50.00	60.00	60.00	50.00	60.00	50.00

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only moderate proportions. Stocks of lead at United States refineries on August 1 were 133,958 tons, compared with 139,698 tons on July 1 and the peak for the year of 142,370 tons on June 1. This compared with stocks of 62,880 tons on August 1, 1930, according to the American Bureau of Metal Statistics. Production of lead from domestic ore in July was 32,157 tons, against 30,708 tons in June and 51,538 tons in July, 1930. Total production, including that from secondary and foreign ore, was 36,566 tons, compared with 34,391 tons in June and 56,204 tons in July, 1930. Shipments during the month were 42,-219 tons, the highest since November, 1930, and comparing with 37,054 tons in June and 48,816 tons in July, 1930.

Methanol — The market for both the natural and the synthetic was quiet during the month. Prices were unchanged. Figures for six months production of methanol show an increased output of the synthetic product in contrast to the decline in that from wood distillation.

	Production Jan.-June 1930 Gallons	Jan.-June 1931 Gallons
Refined methanol		
Wood distillation	2,480,207	1,206,901
Synthetic	3,225,750	4,388,265
Crude methanol	2,805,944	2,228,973
	Stocks June 30 1930 Gallons	1931 Gallons
Refined methanol		
Wood distillation	530,698	413,906
Synthetic	1,208,847	2,908,666
Crude methanol	710,147	624,543

Consumption of synthetic for anti-freeze is expected to show a large increase and production is reported to be heavier with this outlet inview.

Mining Chemicals — Despite the generally restricted state of mining in all parts of the world mining chemicals were holding at fairly firm levels. Despite the falling off in the Canadian imports of coal-tar ore floatation agents (fanthates, cresylic acid and its compounds) to 1,309,492 pounds in 1930, as compared with the 1,596,634 pounds bought abroad in the preceding year, the United States sales of these products to Canada advanced about 50 per cent. Canadian imports of the foregoing compounds during 1929-30 follow:

1929 Sources	Pounds	Value
United States	373,988	$45,540
United Kingdom	1,177,519	53,580
Other countries	45,127	4,001
	1,596,634	103,121

1930 Sources	Pounds	Value
United States	647,695	$76,804
United Kingdom	593,838	20,573
Other countries	67,959	6,891
	1,309,492	104,268

1930 figures preliminary and subject to revision.

Naphtha Solvent — A firm market for this commodity and prices were unchanged.

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Magnesium							
Magnesium Carb, tech, 70 lb bags NY lb.	.06	.06½	.06	.06½	.06½	.06	.06½	.06
Chloride flake, 375 lb. drs c-l wks ton	.....	36.00	.....	36.00	36.00	36.00	36.00	36.00
Imported shipment ton	31.75	33.00	31.75	33.00	33.00	31.75	33.00	33.00
Fused, imp, 900 lb bbls NY ton	.....	31.00	.....	31.00	31.00	31.00	31.00	31.00
Fluosilicate, crys, 400 lb bbls wks lb.	.10	.10½	.10	.10½	.10½	.10	.10½	.10
Oxide, USP, light, 100 lb bbls lb.	.....	.42	.....	.42	.42	.42	.42	.42
Heavy, 250 lb bbls lb.	.....	.50	.....	.50	.50	.50	.50	.50
Peroxide, 100 lb cs lb.	1.00	1.25	1.00	1.25	1.25	1.00	1.25	1.00
Silicofluoride, bbls lb.	.09½	.10½	.09½	.10½	.10½	.09½	.10½	.09½
Stearate, bbls lb.	.24	.26	.24	.26	.26	.25	.26	.25
Manganese Borate, 30%, 200 lb bbls lb.	.....	.19	.....	.19	.19	.19	.24	.19
Chloride, 600 lb casks lb.	.07½	.08½	.07½	.08½	.08½	.07½	.08½	.08
Dioxide, tech (peroxide) drs lb.	.03½	.06	.03½	.06	.06	.03½	.06	.04½
Ore, Powdered or granular.. 75-80%, bbls lb.	.02½	.03	.02½	.03	.03	.02½	.03½	.02½
80-85%, bbls lb.	.....	.03½	.....	.03½	.03½	.03½	.04½	.03½
85-88%, bbls lb.	.04	.04½	.04	.04½	.04½	.04	.05½	.04
Sulfate, 550 lb drs NY lb.	.07	.08	.07	.08	.08	.07	.08½	.07
Mangrove 55%, 400 lb bbls.. lb.	.....	.04	.03½	.04	Nom.	.03½	Nom.	.03½
Bark, African ton	26.00	27.00	25.50	29.75	33.00	29.75	35.00	30.00
Marble Flour, bulk ton	14.00	15.00	14.00	15.00	15.00	14.00	15.00	14.00
Mercurous chloride lb.	.....	1.27	1.27	2.05	2.05	2.05	2.05	2.05
Mercury metal 76 lb flask	82.00	85.00	82.00	106.00	124.50	106.00	126.00	120.00
Meta-nitro-aniline lb.	.67	.69	.67	.69	.69	.67	.74	.67
Meta-nitro-para-toluidine 200 lb. bbls lb.	1.40	1.55	1.40	1.55	1.55	1.50	1.55	1.50
Meta-phenylene-diamine 300 lb. bbls lb.	.80	.84	.80	.84	.84	.80	.90	.80
Meta-toluene-diamine, 300 lb bbls lb.	.67	.69	.67	.69	.69	.67	.72	.67
Methanol								
Methanol, (Wood Alcohol),.... 95% gal.	.33	.35	.33	.37	.48	.35	.65	.51
97% gal.	.34	.39	.34	.43	.49	.39	.65	.53
Pure, Synthetic drums cars gal.	.39½	.41½	.39½	.42½	.50	.42½	.68	.53
Synthetic tanks gal.	.....	.35½	.35½	.40½	.50	.40½	.66	.54
Methyl Acetate, drums gal.	.. ..	Nom.	.....	Nom.	Nom.	Nom.	.95	.95
Acetone, gal.	.50	.55	50	.70	.77	.65	.85	.73
Anthraquinone, lb.	.85	.95	.85	.95	.85	.70	.95	.85
Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	.....	.....	.....	.....	.....	.....
Chloride, 90 lb cyl lb.	.45	.45	.45	.45	.45	.45	.60	.45
Furoate, tech., 50 gal. dr., lb.	.....	.50	.....	.50	.50	.50	.50	.50
Mica, dry grd. bags wks lb.	65.00	80.00	65.00	80.00	80.00	65.00	80.00	65.00
Wet, ground, bags wks lb.	110.00	115.00	110.00	115.00	115.00	110.00	115.00	110.00
Michler's Ketone, kegs lb.	.....	3.00	.....	3.00	3.00	3.00	3.00	3.00
Monochlorobenzene, drums see, Chorobenzene, mono lb.								
Monomethylparaminosufate 100 lb drums lb.	3.75	4.00	3.75	4.00	4.00	3.75	4.20	3.75
Montan Wax, crude, bags lb.	.05½	.07	.05½	.07	.07	.06	.07	.06½
Myrobalans 25%, liq bbls b	.03½	.04½	.03½	.04½	.04½	.03½	.04½	.03½
50% Solid, 50 lb boxes lb.	.05	.05½	.05	.05½	.05½	.05	.08½	.05
J1 bags ton	34.00	35.00	34.00	35.00	41.00	34.00	43.00	40.00
J 2 bags ton	19.50	20.00	19.00	22.50	26.50	19.75	40.00	26.50
R 2 bags ton	18.00	18.50	18.00	20.00	27.50	19.00	34.00	27.50
Naphtha, v. m. & p. (deodorized) bbls gal.	.14	.16	.14	.18	.16	.16	.18	.16
Naphthalene balls, 250 lb bbls wks lb.	.03¾	.04¼	.03¾	.04¼	.05½	.03¾	.05½	.05½
Crushed, chipped bgs wks lb.	.....	.04	.....	.04	.04½	.04	.04½	.04½
Flakes, 175 lb bbls wks lb.	.....	.03¾	.....	.03¾	.05	.03¾	.05	.05
Nickel Chloride, bbls kegs lb.	.18	.20	.18	.21	.21	.20	.24	.20
Oxide, 100 lb kegs NY lb.	.37	.40	.37	.40	.40	.37	.40	.37
Salt bbl. 400 bbls lb NY lb.	.10½	.13	.10½	.13	.13	.10½	.13	.13
Single, 400 lb bbls NY lb.	.10½	.12	.10½	.12	.13	.10½	.13	.13
Metal ingot lb.	.35	.35	.35	.....	.....	.....	.....	.....
Nicotine, free 40%, 8 lb tins, cases lb.	1.25	1.30	1.25	1.30	1.30	1.25	1.30	1.25
Sulfate, 10 lb tins lb.	.98½	1.20	.98½	1.20	1.20	.98½	1.20	.98½
Nitre Cake, bulk ton	12.00	14.00	12.00	14.00	18.00	12.00	18.00	12.00
Nitrobenzene, redistilled, 1000 lb drs wks lb.	.09	.09½	.09	.09½	.09½	.09	.10½	.09
Nitrocellulose, c-l-l-cl, wks lb.	.25	.36	.25	.36	.36	.25	.36	.25
Nitrogenous Material, bulk unit	1.75	2.00	1.75	2.70	3.40	2.50	4.00	3.40
Nitronaphthalene, 550 lb bbls lb.	.....	.25	.....	.25	.25	.25	.25	.25
Nitrotoluene, 1000 lb drs wks lb.	.14	.15	.14	.15	.15	.14	.15	.14
Nutgalls Aleppy, bags lb.	.16	.16½	.16	.16½	.16½	.16	.16½	.16
Chinese, bags lb.	.12	.13	.12	.13	.13	.12	.13	.12
Oak Bark, ground ton	30.00	35.00	30.00	35.00	35.00	30.00	50.00	30.00
Whole ton	20.00	23.00	20.00	23.00	23.00	20.00	23.00	20.00
Orange-Mineral, 1100 lb casks NY lb.	.11¾	.13	.11¾	.13	.13	.11¾	.13½	.11¾
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.25	2.15	2.25	2.15
Orthoanisidine, 100 lb drs lb.	2.50	2.60	2.50	2.60	2.60	2.50	2.60	2.50
Orthochlorophenol, drums lb.	.50	.65	.50	.65	.65	.50	.65	.50
Orthocresol, drums lb.	.25	.25	.25	.25	.35	.18	.28	.18
Orthodichlorobenzene, 1000 lb drums lb.	.07	.10	.07	.10	.10	.07	.10	.07
Orthonitrochlorobenzene, 1200 lb drs wks lb.	.30	.33	.30	.33	.33	.30	.33	.30
Orthonitrotoluene, 1000 lb drs wk lb.	.16	.18	.16	.18	.18	.16	.18	.16
Orthonitrophenol, 350 lb dr lb.	.85	.90	.85	.90	.90	.85	.90	.85
Orthotoluidine, 350 lb bbl 1c-1 lb.	.28	30	.25	.30	.30	.25	.30	.25

CHEMICAL
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Chemical Sales Department
Rochester, N. Y.

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

Nickel Salt — While August was a very poor month producers were optimistic for September deliveries due to the return of several automotive companies to production.

Nitrocellulose — No important change has occured in this market for some time. Prices remain quite stable in the face of restricted demand from most consuming channels.

Pine Oil — This increasingly important naval stores product was in fair demand during the month with prices fairly steady. It is reported that approximately 2,700,000 gallons of steam-distilled pine oil are produced in the United States annually. During recent years a rather substantial export trade in pine oil has been developed. Exports during the first six months of 1931 amounted to 224,610 gallons, valued at $125,472, contrasted with 145,156 gallons, worth $83,297, shipped to foreign countries during the corresponding period of 1930.

Potash — The basic prices remained unaltered, but with the turn of the month the discount of 5% was withdrawn and 4% for September substituted. Considerable interest was aroused in the part domestic production would play in the coming fertilizer season. German fertilizer potash exports between January and May, 1931, showed a marked increase over the corresponding periods of the two previous years, the quantity of metric tons being as follows: 1929, 505,688; 1930, 516,324; 1931, 740,287. Domestic sales of potash during the current fertilizer year ended June 30, 1931, are estimated at 700,000 metric tons of potash (K20) content, or a decrease of 10 per cent against the fertilizer year 1929-30. French production during April and May of 1931 was 367,178 metric tons compared with 548,777 tons for the same months in 1930. The potash content was 55,960 and 88,318 tons for the periods respectively. Conditions in the potash fields have not been favorable since October, 1930. Sales have been light and exports to the United States, the best foreign customer, have been below normal. The domestic consumption is also below normal. During the past eight months the mines have been worked only 40 hours per week.

Potassium Bichromate — Withdrawals against contracts were satisfactory, but spot business was dull. Prices remained unchanged.

Quicksilver — The extreme weakness in this market following the collapse of the foreign cartel was further reflected in a reduction of $5 a flask on Aug. 6, the present market being based on $82 for the 76 lb. flask with sales limited. Con-

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Orthonitroparachlorphenol, tins ....lb.	.70	.75	.70	.75	.75	.70	.75	.70
Osage Orange, crystals.....lb.	.16	.17	.16	.17	.17	.16	.17	.16
51 deg. liquid.....lb.	.07	.07½	.07	.07½	.07½	.07	.07½	.07
Powdered, 100 lb bags.....lb.	.14½	.15	.14½	.15	.15	.14½	.15	.14½
Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P.....lb.	.....	.03	.03¼	.03	.04¾	.03¼	.06¾	.04¼
128-132 deg. M. P.....lb.	.....	.03¼	.03¼	.03¼	.06¾	.03¼	.07	.04¼
133-137 deg. M. P. .....lb.	.....	.04¼	.04¾	.04¼	.07½	.04¾	.07¾	.06½
Para Aldehyde, 110-55 gal drs..lb.	.20½	.23	.20½	.23	.23	.20½	.28	.20½
Aminoacetanilid, 100 lb bg..lb.	.52	.60	.52	.60	1.05	.52	1.05	1.00
Aminohydrochloride, 100 lb kegs.....lb.	1.25	1.30	1.25	1.30	1.30	1.25	1.30	1.25
Aminophenol, 100 lb keg...lb.	.82	.84	.82	.86	1.02	.92	1.15	.99
Chlorophenol, drums.....lb.	.50	.65	.50	.65	.65	.50	.65	.50
Coumarone, 330 lb drums. lb.	.....	.....	.....	.....	.....	.....	.....	.....
Cymene, refd, 110 gal dr. .gal.	2.25	2.50	2.25	2.50	2.50	2.25	2.50	2.25
Dichlorobenzene, 150 lb bbls wks.....lb.	.15½	.16	.15½	.20	.20	.17	.20	.17
Nitroacetanilid, 300 lb bbls.lb.	.50	.55	.50	.55	.55	.50	.55	.50
Nitroaniline, 300 lb bbls wks .....lb.	.48	.55	.48	.55	.55	.48	.55	.48
Nitrochlorobenzene, 1200 lb drs wks.....lb.	.23	26	.23	.26	.26	.23	.26	23
Nitro-orthotoluidine, 300 lb bbls.....lb.	2.75	2.85	2.75	2.85	2.85	2.75	2.85	2.75
Nitrophenol 185 lb bbls....lb.	.45	50	.45	.50	.50	.45	.55	.45
Nitrosodimethylaniline, 120 lb. bbls.....lb.	.92	.94	.92	.94	.94	.92	.94	.92
Nitrotoluene, 350 lb bbls....lb.	.29	.31	.29	.31	.31	.29	.31	.29
Phenylenediamine, 350 lb bbls .....lb.	1.15	1.20	1.15	1.20	1.20	1.15	1.20	1.15
Toluenesulfonamide, 175 lb bbls.....lb.	.70	.75	.70	.75	.75	.70	.75	.70
Toluenesulfonchloride, 410 lb bbls wks.....lb.	.20	.22	.20	.22	.22	.20	.22	.20
Toluidine, 350 lb bbls wk...lb.	.42	.43	.40	.44	.40	.38	.42	.38
Paris Green, Arsenic Basis 100 lb kegs.....lb.	.....	.27	.....	.27	.27	.27	.27	25
250 lb kegs.....lb.	.....	.26	.25	.26	.25	.25	.25	.23
Persian Berry Ext., bbls.....lb.	.25	Nom.	.25	Nom.	Nom.	.25	25	.25
Pentasol (see Alcohol, Amyl)...								
Pentasol Acetate (see Amyl Acetate)								
Petrolatum, Green, 300 lb bbl.lb.	.02	.02½	.02	.02½	.02½	.02	.02½	.02
Phenol, 250-100 lb drums.....lb.	.14½	.15	.14½	.15	.15	.14½	.16	.13
Phenyl - Alpha - Naphthylamine, 100 lb kegs.....lb.	.....	1.35	.....	1.35	1.35	1.35	1.35	1.35
Phenylhydrazine Hydrochloride .....lb.	2.90	3.00	2.90	3.00	3.00	2.90		
Phosphate								
Phosphate Acid (see Superphosphate)								
Phosphate Rock, f.o.b. mines Florida Pebble, 68% basis..ton	3.10	3.25	3.10	3.25	3.15	3.00	3.15	3.00
70% basis.....ton	3.75	3.90	3.75	3.90	4.00	3.75	4.00	3.50
72% basis.....ton	4.25	4.35	4.25	4.35	4.50	4.25	4.50	4.00
75-74% basis.....ton	5.25	5.50	5.25	5.50	5.50	5.25	5.50	5.00
75% basis.....ton	.....	5.75	.....	5.75	5.75	5.75	5.75	5.75
77-80% basis.....ton	.....	6.25	.....	6.25	6.25	6.25	6.25	6.25
Tennessee, 72% basis.....ton	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Phosphorous Oxychloride 175 lb cyl.....lb.	.18	.20	.18	.20	.25	.18	.40	.20
Red, 110 lb cases.....lb.	.37½	.42	.37½	.42	.42	.37½	.60	.37½
Yellow, 110 lb cases wks..lb.	.31	.37½	.31	.37½	.37½	.31	.32	.31
Sesquisulfide, 100 lb cs.....lb.	.....	.44	.....	.44	.44	.44	.46	.44
Trichloride, cylinders.....lb.	.18	.20	.18	.20	.25	.18	.35	.20
Phthalic Anhydride, 100 lb bbls wks.....lb.	.15	.16	.15	.16	.20	.15	.20	.18
Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	37.00	45.00	45.00	37.00	45.00	37.00
Pine Oil, 55 gal drums or bbls Destructive dist.....lb.	.63	.64	.63	.64	.64	.63	.64	.63
Prime bbls.....bbl.	8.00	10.60	8.00	10.60	10.60	8.00	10.60	8.00
Steam dist. bbls.....gal.	.54	.61	.54	.70	.70	.65	.70	.65
Pitch Hardwood,..... wks.....ton	35.00	45.00	35.00	45.00	45.00	35.00	45.00	40.00
Plaster Paris, tech, 250 lb bbls .....bbl.	3.30	3.50	3.30	3.50	3.50	3.30	3.50	3.30
Platinum, Refined.....oz.	27.00	28.00	27.00	28.00	.....	.....	.....	.....
Potash								
Potash, Caustic, wks, solid...lb.	.06½	.06¾	.06½	.06¾	.06¾	.06½	.07½	.06½
flake .....lb.	.0705	08	.0705	.08	.08	.0705	.07½	.0705
Potash Salts, Rough Kainit 12.4% basis bulk.....ton	.....	9.20	.....	9.20	9.20	9.10	9.10	9.00
14% basis.....ton	.....	9.70	.....	9.70	9.70	9.60	9.60	9.50
Manure Salts..... 20% basis bulk.....ton	.....	12.65	.....	12.65	12.65	12.50	12.50	12.40
30% basis bulk.....ton	.....	19.15	.....	19.15	19.15	18.95	18.95	18.75
Potassium Acetate.....lb.	.28	.30	.28	.30	.30	.27		
Potassium Muriate, 80% basis bags.....ton	.....	37.15	.....	37.15	37.15	36.75	36.75	36.40
Pot. & Mag. Sulfate, 48% basis bags.....ton	.....	27.80	.....	27.80	27.80	27.50	27.50	27.00
Potassium Sulfate, 90% basis bags.....ton	.....	48.25	....	48.25	48.25	47.75	47.75	47.30
Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.09½	.10	.09½	.10	.10	.09½	.14	.09½
Bichromate Crystals, 725 lb casks.....lb.	.08¾	.09½	.08¾	.09½	.09½	.08¾	.09½	.09
Powd., 725 lb cks wks....lb.	.13	.13½	.13	.13½	.13½	.13	.13½	.13

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

sumers are doing little forward buying at the moment.

Rochelle Salts — This item was reduced to 17½c on Aug. 24.

Rosin — Prices fell to new low levels during August. Sales for both domestic and import consumption are considerably below normal and despite the strong arm efforts to revive the situation and to clear up the present chaotic condition the outlook is not so very promising. However, the bright spot in the picture is that production of the next crop will in all probability drop to a much lower level than has prevailed for the past two years.

Sal Soda — Prices remained firm at current levels. Shipments were slightly better than in July.

Shellac — The quiet undertone prevailing in July continued through August. Prices remained fairly stable despite very little actual spot or forward buying. Some improvement in demand was expected with the end of the vacation period.

Soda Ash — The alkali markets continued to pass through a very dull period with spot sales and inquiries below last year.

Sodium Bichromate — Demand was spotty with some industries taking normal quantities while others were considerably below normal. Consumers are beginning to give attention to the question of prices for next year.

Sodium Nitrate — The market is at a standstill at the moment with producers unwilling to name prices for the coming fertilizer season. It is hardly possible that producers can withhold prices very much longer. It is rather difficult to hazard even a guess as to the probable trend because of the uncertainty surrounding the international situation in nitrogen. Important factors still are of the opinion that a truce of one sort or another will be patched up between the synthetic and natural producers.

Sodium Phosphate — The tri-salt demand was fair and prices were holding at the higher levels reached last month. A sort of status quo exists in this market for the moment, but productive capacity is greatly in excess of present requirements. The di-salt appeared to be unaffected by the strikes in the textile centers and fair quantities were being consumed in silk-weighting operations.

Sodium Silicofluoride — Production of this item has been somewhat curtailed during the past six months due to restricted operations in the fertilizer industry. Prices for this reason have been very firm. One well-known domestic factor returning from abroad during the past month stated that "there has been

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Binoxiate, 300 lb bbls.....lb.	.14	.14	.17	.17	.14	.17	.14
Bisulfate, 100 lb kegs.....lb.	.....	.30	.....	.30	.30	.30	.30
Carbonate, 80-85% calc. 800 lb casks.....lb.	.....	.05	.05	.05½	.05½	.05½	.05½
Chlorate crystals, powder 112 lb keg wks.....lb.	.08	.08½	.08	.08½	.09	.08	.09	.08½
Chloride, crys bbls.....lb.	.05½	.06	.05½	.06	.06	.05½	.05½	.05½
Chromate, kegs.....lb.	.23	.28	.23	.28	.28	.23	.28	.23
Cyanide, 110 lb. cases.....lb.	.55	.57½	.55	.57½	.57½	.55	.57½	.55
Metabisulfite, 300 lb. bbl...lb.	.12	.13	.12	.13	.13	.12	.13	.11
Oxalate, bbls.....lb.	.20	.24	.20	.24	.24	.20	.24	.16
Perchlorate, casks wks.....lb.	.11	.12	.11	.12	.12	.11	.12	.11
Permanganate, USP, crys 500 & 100 lb drs wks.....lb.	.16	.16½	.16	.16½	.16½	.16	.16½	.16
Prussiate, red, 112 lb keg...lb.	.38	.40	.38	.40	.40	.38	.40	.38
Yellow, 500 lb casks.....lb.	.18½	.21	.18½	.21	.21	.18½	.21	.18½
Tartrate Neut, 100 lb keg..lb.	.....	.21	.....	.21	.21	.21	.51	.51
Titanium Oxalate, 200 lb bbls .....lb.	.21	.23	.21	.23	.23	.21	.25	.21
Propyl Furoate, 1 lb tins.....lb.	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Pumice Stone, lump bags.....lb.	.04	.05	.04	.05	.05	.04	.05	.04
250 lb bbls.....lb.	.04½	.06	.04½	.06	.06	.04½	.06	.04½
Powdered, 350 lb bags.....lb.	.02½	.03	.02½	.03	.03	02½	.03	.02½
Putty, commercial, tubs..100 lb.	.....	.03½	.....	.03½	.03½	.03½	.03½	.03½
Linseed Oil, kegs.....100 lb.	.....	.05½	.....	.05½	.05½	.05½	.05½	.05½
Pyridine, 50 gal drums.....gal.	1.50	1.75	1.50	1.75	1.75	1.50	1.75	1.50
Pyrites, Spanish cif Atlantic ports bulk.....unit	.13	.13½	.13	.13½	.13½	.13	.13½	.13
Quebracho, 35% liquid tks....lb.	.02½	.03	.02½	.04	.04	.02½	.04	.03
450 lb bbls c-l.....lb.	.03½	.03½	.03½	.03½	.03½	.03½	04½	.03½
35% Bleaching, 450 lb bbl .lb.	.04	.05½	.04	.05½	.04½	.05½	.04½	.05½
Solid, 63%, 100 lb bales cif..lb.	.02½	.03½	.02½	.05½	.05½	.05	.05½	.05½
Clarified, 64%, bales.....lb.	.....	.03½	.03½	.05½	.05½	.05½	.05½	.05½
Quercitron, 51 deg liquid 450 lb bbls.....lb.	.05½	.06	.05½	.06	.06	.05½	.06	.05½
Solid, 100 lb boxes.....lb.	.09½	.13	.09½	.13	.13	.09½	.13	.10
Bark, Rough.....ton	.....	14.00	.....	14.00	14.00	14.00	14.00	14.00
Ground.....ton	34.00	35.00	34.00	35.00	35.00	34.00	35.00	34.00
R Salt, 250 lb bbls wks.....lb.	.40	.44	.40	.44	.45	.40	.46	.44
Red Sanders Wood, grd bbls..lb.	.....	.18	.....	.18	.18	.18	.18	.18
Resorcinol Tech, cans.....lb.	.65	.70	.65	1.25	1.25	.90	1.25	1.15
Rosin Oil, 50 gal bbls, first run .....gal.	.....	.50	.50	.58	.58	.56	.62	.57
Second run.....gal.	.....	.54	.54	.61	.61	.59	.64	.60
Rosin								
Rosins 600 lb bbls 280 lb...unit ex. yard N. Y.								
B.....	4.00	4.20	4.00	4.95	7.75	5.35	9.25	7.45
D.....	4.05	4.25	4.05	5.50	8.00	5.50	9.25	7.70
E.....	4.10	4.30	4.10	5.90	8.17	5.52½	9.27	8.30
F.....	4.15	4.35	4.15	6.20	8.45	5.55	9.27	8.40
G.....	4.20	4.40	4.20	6.25	8.45	5.60	9.45	8.40
H.....	4.25	4.45	4.25	6.30	8.55	5.60	9.50	8.40
I.....	4.30	4.50	4.30	6.35	8.58	5.62½	9.50	8.40
K.....	4.35	4.55	4.35	6.45	8.65	5.62½	9.55	8.45
M.....	4.40	4.60	4.40	6.70	8.80	5.65	9.85	8.50
N.....	4.95	5.00	4.95	6.95	8.95	6.05	10.30	8.93
WG.....	6.15	6.20	6.15	8.15	9.25	6.85	11.30	9.00
WW.....	6.45	6.50	6.45	8.90	9.85	7.85	12.30	9.30
Rotten Stone, bags mines....ton	24.00	20.00	24.00	20.00	30.00	18.00	30.00	24.00
Lump, imported, bbls.....lb.	.05	.07	.05	.07	.07	.05	.08	.05
Selected bbls.....lb.	.09	.12	.09	.12	.12	.09	.12	.09
Powdered, bbls.....lb.	.02	.05	.02	.05	.05	.02	.05	.02
Sago Flour, 150 lb bags.....lb.	.04½	.05	.04½	.05	.05	.04½	.05	.04½
Sal Soda, bbls wks.....100 lb.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Salt Cake, 94-96% c-l wks. .ton	15.00	15.50	15.50	19.00	24.00	15.50	24.00	19.00
Chrome .....ton	14.00	14.50	14.00	17.00	25.00	14.50	21.00	12.00
Saltpetre, double refd granular 450-500 lb bbls.....lb.	.06	.06½	.06	.06½	.06½	.06½	.06½	.06½
Satin, White, 500 lb bbls.....lb	.....	.01½	.....	.01½	.01½	.01½	.01½	.01½
Shellac Bone dry bbls.....lb.	.28	.30	.28	.29	.47	.28	.61	.47
Garnet, bags .....lb.	.19	.20	.19	.26	.40	.24	.45	.40
Superfine, bags.....lb.	.....	.17½	.17½	.22	.39	.20	.47	.39
T. N. bags.....lb.	.16	.16½	.16	.17	.34	.18	.44	.36
Schaeffer's Salt, k gs.....lb.	.53	.57	.53	.57	.57	.53	.57	.53
Silica, Crude, bulk mines....ton	8.00	11.00	8.00	11.00	11.00	8.00	11.00	8.00
Refined, floated bags.....ton	22.00	30.00	22.00	30.00	30.00	22.00	30.00	22.00
Air floated bags.....ton	.....	32.00	.....	32.00	32.00	32.00	32.00	32.00
Extra floated bags.....ton	32.00	40.00	32.00	40.00	40.00	32.00	40.00	32.00
Soapstone, Powdered, bags f. o. b. mines.....ton	15.00	22.00	15.00	22.00	22.00	15.00	22.00	15.00
Soda								
Soda Ash, 58% dense, bags c-l wks.....100 lb.	.....	1.17½	.....	1.17½	1.40	1.40	1.40	1.40
58% light, bags.....100 lb.	.....	1.15	.....	1.15	1.34½	1.34½	1.34½	1.34½
Contract, bags c-l wks.100 lb.	.....	1.15	1.15	1.15	1.32	1.32	1.32	1.32
Soda Caustic, 76% grnd & flake drums.....100 lb.	.....	2.90	.....	2.90	3.35	3.00	3.35	3.35
76% solid drs.....100 lb.	.....	2.50	.....	2.50	2.95	2.90	2.95	2.95
Sodium Acetate, tech....450 lb. bbls wks.....lb.	.05½	.06	.04½	.06	.05½	.04	.06½	.04½
Arsenate, drums.....lb.	.18	.19	.18	.19	.19	.18	.19	.18
Arsenite, drums.....gal.	.50	.75	.50	.75	1.00	.50	1.50	.75
Bicarb, 400 lb bbl NY..100 lb.	.....	2.35	2.35	2.35	2.41	2.41	2.41	2.41

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UNITED STATES POTASH CO.
598 Madison Ave., New York

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

a reduction of approximately 60 per cent in the production of the by-product abroad owing to the low rate of operations in the fertilizer trade. He also states that prices have been so low that producers have decided to turn to the manufacture of other products. In addition to its wide use in the ceramics trade, and as a laundry scouring agent, many new outlets are being developed."

Sodium Silicate — August witnessed an improvement in inquiries and orders from contract sources. The corrugated box industry was specially active. The silk weighting centers were taking fair size quantities despite the labor situation.

Sodium Stannate — With the tin market at a higher level sodium stannate was advanced 1½c at the close of the month. With tin restriction apparently functioning leading factors were of the opinion that prices would stabilize.

Tankage — Business has been done in the ground material at $1.75 and 10 per unit-ton, a figure which might be shaded, it was reported at the close of the month to as low as $1.65 and unground tankage sold at $1.40 and 10, also subject to concessions. Buying is limited, but unsold supplies are not plentiful.

Tin Crystals — With the metal market higher producers announced an increase of a cent a pound, the new level Aug. 21 being 26c.

Tin Tetrachloride — Anhydrous was increased to .183c on Aug. 21. The curtailment of production in leading tin producing countries is beginning to make itself felt and with Siam within the fold as of Sept. 1 further strengthening in the market is expected.

Turpentine — Prices moved within very narrow limits during the month but it appeared definitely certain that there was little likelihood that prices in Savannah would go below 31c the low mark for the year. Several fairly large sales were reported above this figure. From present reports the next production will be under last and this more than anything else is looked upon with much hope from marketing factors. While Farm Board relief has helped considerably in the present chaotic condition, only a radical reduction in production can affect permanent stabilization in the industry.

Urea — Shipment of urea from abroad has been reduced temporarily to $82.60 per ton, ex vessel at Atlantic or Gulf ports, a quotation which is effective until September 30th, only, and which may be changed without notice.

The fats and oils moved within very narrow limits during the month. Prices generally were slightly lower. Consumers

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Bichromate, 500 lb cks wks. lb.	.07	.07	.07½	.07½	.07	.07½	.07
Bisulfite, 500 lb bbl wks. lb.	.....	.04	.....	.04	.04	.04	.04
Carb. 400 ib bbls NY. 100 lb.	.....	2.30	.....	2.30	2.30	2.30	1.35	1.30
Chlorate, ... wks. lb.	.05½	.07½	.05½	.07½	.08	.05½	.11	.06½
Chloride, technical ..... ton	12.00	13.00	12.00	13.00	13.00	12.00	13.00	12.00
Cyanide, 96-98%, 100 & 250 lb drums wks ..... lb.	.16	.17	.16	.17	.20	.16	.20	.18
Fluoride, 300 lb bbls wks. lb.	.07½	.08½	.07½	.08½	.09	.08½	.09	.08½
Hydrosulfite, 200 lb bbls f. o. b. wks ..... lb.	.22	.24	.22	.24	.24	.22	.24	.22
Hypochloride solution, 100 lb cbys ..... lb.	.....	.05	.....	.05	.05	.05	.05	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks ..... 100 lb.	2.40	3.00	2.40	3.00	3.00	2.40	3.05	2.50
Technical, regular crystals 375 lb bbls wks. 100 lb.	2.50	2.65	2.50	2.65	2.65	2.50	2.65	2.40
Metanilate, 150 lb bbls. lb.	.44	.45	.44	.45	.45	.44	.45	.45
Metasilicate, c-l, wks. 100 lb.	.....	4.00	.....	4.00	.....	.....	.....	.....
Monohydrate, bbls ..... lb.	.....	.02½	.....	.02½	.02½	.02½	.02½	.02½
Naphthionate, 300 lb bbl. lb.	.52	.54	.52	.54	.57	.52	.57	.54
Nitrate, 92%, crude, 200 lb bags c-1 NY ..... 100 lb.	.....	2.05	2.02	2.07	2.22½	1.99	2.22½	2.09
Nitrite, 500 lb bbls spot. lb.	.07	.08	.07½	.08	.08	.07½	.08	.07½
Orthochlorotoluene, sulfonate, 175 lb bbls wks ..... lb.	.25	.27	.25	.27	.27	.25	.27	.25
Oxalate Neut, 100 lb kegs. lb.	.37	.42	.37	.42	.42	.37	.42	.37
Perborate, 275 lb bbls. lb.	.18	.20	.18	.20	.20	.18	.22	.18
Phosphate, di-sodium, tech. 310 lb bbls ..... 100 lb.	2.50	3.00	2.50	3.00	3.25	2.65	3.55	3.25
tri-sodium, tech, 325 lb bbls ..... 100 lb.	.....	3.20	3.15	3.50	4.00	3.25	4.00	3.90
Picramate, 100 lb kegs. lb.	.6	.72	.69	.72	.72	.69	.72	.69
Prussiate, Yellow, 350 lb bbl wks ..... lb.	.11½	.12	.11½	.12	12½	.11½	.12½	.12
Pyrophosphate, 100 lb keg. lb.	.15	.20	.15	.20	.20	.15	.20	.15
Silicate, 60 deg 55 gal drs, wks ..... 100 lb.	1.65	1.70	1.65	1.70	1.70	1.65	1.70	1.65
40 deg 55 gal drs, wks ..... 100 lb.	.....	.75	.75	1.00	.80	.70	.80	.70
Silicofluoride, 450 lb bbls NY ..... lb.	.....	.04½	.04	.04½	.05½	.04	.05½	.05
Stannate, 100 lb drums. lb.	.....	.21	.19½	.26	.43	.24	.43	.38
Stearate, bbls ..... lb.	.20	.25	.20	.25	.29	.20	.29	.25
Sulfanilate, 400 lb bbls. lb.	.16	.18	.16	.18	.18	.16	.18	.16
Sulfate Anhyd, 550 lb bbls c-1 wks ..... lb.	.02½	.02½	.02½	.02½	.02½	.02½	.02½	.02½
Sulfide, 80% crystals, 440 lb bbls wks ..... lb.	.02½	.02½	.02½	.02½	.02½	.02½	.02½	.02½
62% solid, 650 lb drums 1c-1 wks ..... lb.	.03	.03½	.03	.03½	.03½	.03	.04	.03½
Sulfite, crystals, 400 lb bbls wks ..... lb.	.03	.03½	.03	.03½	.03½	.03	.03½	.03
Sulfocyanide, bbls. lb.	.28	.35	.28	.35	.35	.28	.76	.28½
Tungstate, tech, crystals, kegs ..... lb.	.81	.88	.81	.88	.88	.81	1.40	.88
Solvent Naphtha, 110 gal drs wks ..... gal.	.30	.38	.30	.38	.40	.30	.40	.35
Spruce, 25% liquid, bbls. lb.	.....	.01½	.....	.01½	.01½	.01½	.01½	.01½
25% liquid, tanks wks. lb.	.....	.01	.....	.01	.01	.01	.01	.01
50% powd, 100 lb bag wks lb.	.02	.02½	.02	.02½	.02½	.02	.02½	.02
Starch, powd., 140 lb bags ..... 100 lb.	.....	2.57	2.57	3.20	4.02	3.42	4.12	3.82
Pearl, 140 lb bags. 100 lb.	.....	2.77	2.77	3.00	3.92	3.32	4.02	3.72
Potato, 200 lb bags. lb.	.05½	.06	.05½	.06	.06½	.05½	.06½	.05½
Imported bags. lb.	.05½	.06½	.05½	.06½	.06½	.05½	.06½	.05½
Soluble ..... lb.	.08	.08½	.08	.08½	.08½	.08	.08½	08
Rice, 200 lb bbls. lb.	.09	.10	.09	.10	.10	.09	.10	.09½
Wheat, thick bags. lb.	.06½	.07	.06½	.07	.07	.06½	.07	.06½
Thin bags. lb.	.09½	.10	.09½	.10	.10	.09½	.10	.09½
Strontium carbonate, 600 lb bbls wks ..... lb.	.07½	.07½	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY. lb.	.09	.09½	.09	.09½	.09½	.09	.09½	.08½
Peroxide, 100 lb drs. lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Sulfur								
Sulfur Brimstone, broken rock, 250 lb bag c-1 ..... 100 lb.	.....	2.05	.....	2.05	2.05	2.05	2.05	2.05
Crude, f. o. b. mines ..... ton	18.00	19.00	18.00	19.00	19.00	18.00	19.00	18.00
Flour for dusting 99½%, 100 lb bags c-1 NY. 100 lb.	.....	2.40	.....	2.40	2.40	2.40	2.40	2.40
Heavy bags c-1 ..... 100 lb.	.....	2.50	.....	2.50	2.50	2.50	2.50	2.50
Flowers, 100%, 155 lb bbls c-1 NY ..... 100 lb.	.....	3.45	.....	3.45	3.45	3.45	3.45	3.45
Roll, bbls 1c-1 NY. 100 lb.	2.65	2.85	2.65	2.85	2.85	2.65	2.85	2.65
Sulfur Chloride, red, 700 lb drs wks ..... lb.	.05	.05½	.05	.05½	.05½	.05	.05½	.05
Yellow, 700 lb drs wks. lb.	.03½	.04½	.03½	.04½	.04½	.03½	.04½	.03½
Sulfur Dioxide, 150 lb cyl. lb.	.07	.07½	.07	.07½	.07½	.07	.08½	.07
Extra, dry, 100 lb cyl. lb.	.10	.12	.10	.12	.12	.10	.19	.10
Sulfuryl Chloride, ... lb.	.15	.40	.15	.40	.65	.10	.65	.10
Talc, Crude, 100 lb bgs NY. ton	12.00	15.00	12.00	15.00	15.00	12.00	15.00	12.00
Refined, 100 lb bgs NY. ton	16.00	18.00	16.00	18.00	18.00	16.00	18.00	16.00
French, 220 lb bags NY. ton	18.00	22.00	18.00	22.00	22.00	18.00	25.00	18.00
Refined, white, bags. ton	35.00	40.00	35.00	40.00	40.00	35.00	45.00	35.00
Italian, 220 lb bags NY. ton	40.00	50.00	40.00	50.00	50.00	40.00	50.00	40.00
Refined, white, bags. ton	50.00	55.00	50.00	55.00	55.00	50.00	55.00	50.00
Superphosphate, 16% bulk, wks ..... ton	.....	7.50	7.50	9.00	9.50	8.00	10.00	9.00
Triple bulk, wks. unit	.....	.65	.....	.65	.65	.....	.....	.....
Tankage Ground NY. unit	.....	1.55&10	1.55	3.20&10	4.00&10	3.20&10	4.50&10	4.00&10
High grade f.o.b. Chicago. unit	.....	1.50&10	1.50	3.25&10	3.85&10	3.25&10	4.80&10	3.75&10
South American cif. unit	.....	2.45&10	2.45	3.40&10	4.25&10	3.40&10	4 80&10	4.35&10
Tapioca Flour, high grade bgs. lb.	.03½	.05	.03½	.05	.05½	.03	.05½	.04½
Medium grade, bags. lb.	.03	.04	.03	.04	.04½	.02½	.04½	.03½
Tar Acid Oil, 15%, drums. gal.	.24	.25	.24	.25	.27	.24	.27	.26
25% drums. gal.	.26	.28	.26	.28	.30	.26	.30	.29

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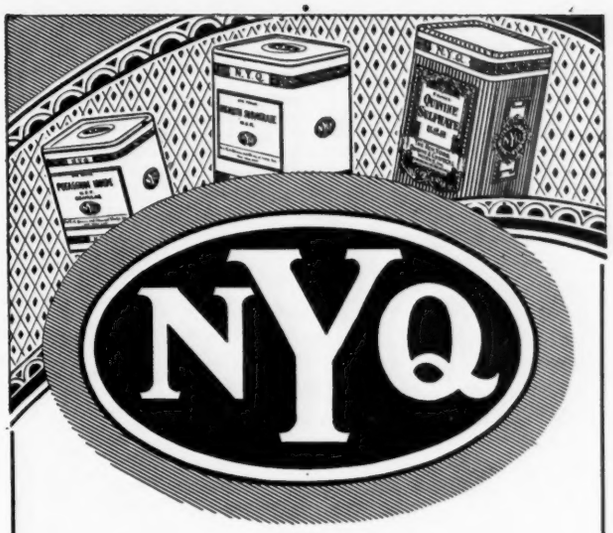

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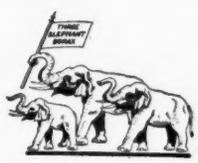

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Aug. 1931 $1.44

apparently are still unwilling to contract very far in advance and this condition continues to have a very unstabilizing influence on the trade. However, production and importations have been reduced considerably in the past three or four months and the figures for the quarter ending June 30, show several important items where production is under consumption. This angle is a favorable one and means a sizable reduction in stocks on hand. Prices are thought to be at or very close to the bottom and that consumers will very shortly place orders above their immediate needs to secure deliveries at current levels.

According to Census returns the factory production of fats and oils (exclusive of refined oils and derivatives) during the three-month period ended June 30, 1931, was as follows: vegetable oils, 389,914,804 pounds; fish oils, 4,646,527 pounds; animal fats, 559,578,840 pounds; and greases, 94,984,724 pounds; a total of 1,049,133,895 pounds. Of the several kinds of fats and oils covered by this inquiry, the greatest production, 408,080,825 pounds appears for lard. Next in order is tallow with 150,480,410 pounds; linseed oil with 130,634,669 pounds; cottonseed oil with 95,214,824 pounds; cocoanut oil with 81,899,181 pounds, and corn oil with 28,978,208 pounds

The production of refined oils during the period was as follows: Cottonseed, 144,719,835 pounds; cocoanut, 67,350,610 pounds; peanut, 2,571,910 pounds; corn, 25,862,345 pounds; soya-bean, 7,816,453 pounds; and palm-kernel, 6,742,679 pounds The quantity of crude oil used in the production of each of these refined oils is included in the figures of crude consumed.

Kind	*Factory operations for the Quarter ended June 30, 1931* Production (pounds)	Consumption (pounds)
Vegetable Oils: (1)		
Cottonseed, crude	95,214,824	163,817,858
Cottonseed, refined	144,719,835	242,191,311
Peanut, virgin and crude	4,061,230	2,943,514
Peanut, refined	2,571,910	3,543,864
Coconut, or copra, crude	81,899,181	139,128,413
Coconut, or copra, refined	67,350,610	78,348,197
Corn, crude	28,978,208	30,355,459
Corn, refined	25,862,345	3,633,722
Soya-bean, crude	10,996,129	11,428,008
Soya-bean, refined	7,816,453	5,494,637
Olive, edible	.....	488,871
Olive, inedible	.....	2,011,810
Sulfur oil or olive foots	.....	10,675,647
Palm-kernel, crude	5,243,433	16,320,201
Palm-kernel, refined	6,742,679	6,191,201
Rapeseed	.....	2,161,485
Linseed	130,634,669	95,544,345
Chinese wood or tung	.....	24,519,502
Chinese vegetable tallow	.....	622,744
Castor	13,732,116	4,612,431
Palm	.....	63,017,635
Sesame	18,951,034	9,330,570
Sunflower seed	.....	9,087,801
All other	203,980	2,102,187
Fish Oils: (1)		
Cod and cod-liver	31,571	3,823,948
Menhaden	862,391	4,811,072
Whale	330	19,614,422
Herring, including sardine	3,536,280	25,302,652
Sperm	.....	319,591
All other, (including marine animal)	215,955	593,810

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Terra Alba Amer. No. 1, bgs or bbls mills	100lb.	1.15	1.15	1.75	1.75	1.15	1.75	1.15
No. 2 bags or bbls	100lb.	1.50	1.50	2.00	2.00	1.50	2.00	1.50½
Imported bags	lb.	.01⅛	.01½	.01⅛	.01½	.01⅛	.02½	.01
Tetrachlorethane, 50 gal dr	lb.	.09	.09½	.09	.09½	.09	.09½	.09
Tetralene, 50 gal drs wks	lb.	.....	.20	.....	.20	.20	.20	.20
Thiocarbanilid, 170 lb bbl	lb.	.26½	.28½	.26½	.28½	.28½	.22	.24	.22
Tin Bichloride, 50% soln, 100 lb bbls wks	lb.	.....	.12½	.....	.12½	.12¾	.12¼	.14¼	.13½
Crystals, 500 lb bbls wks	lb.	.....	.26	.24	.28½	.34	.25	.38	.33
Metal Straits NY	lb.	.....	.24½	.22½	.27	.38	.26	.48	.39
Oxide, 300 lb bbls wks	lb.	.25	.29	.25	.29	.42	.25	.56	.42
Tetrachloride, 100 lb drs wks	lb.	.....	.183	.17¼	.19½	.20½	.18½	.30½	.27¼
Titanium Dioxide 300 lb bbl	lb	.21	.22	.21	.22	.50	.21	.50	.22
Pigment, bbls	lb.	.06½	.07¾	.06½	.07¾	.07¾	.06½	.14	.07¼
Toluene, 110 gal drs	gal.	.....	.34	.....	.34	.40	.35	.45	.45
8000 gal tank cars wks	gal.	.27	.28	.27	.30	.35	.30	.40	.40
Toluidine, 350 lb bbls	lb.	.88	.89	.88	.94	.94	.90	.94	.90
Mixed, 900 lb drs wks	lb.	.27	.32	.27	.32	.32	.27	.32	.31
Toner Lithol, red, bbls	lb.	.90	.95	.90	.95	.95	.90	.95	.85
Para, red, bbls	lb.	.....	.80	.....	.80	.80	.80	.80	.70
Toluidine	lb.	1.50	1.55	1.50	1.55	1.55	1.50	1.55	1.50
Triacetin, 50 gal drs wks	lb.	.32	.36	.32	.36	.36	.32	.36	.32
Trichlorethylene, 50 gal dr	lb.	.10	.10½	.10	.10½	.10½	.10	.10½	.10
Triethanolamine, 50 gal drs	lb.	.40	.42	.40	.42	.42	.40	.60	.55
Tricresyl Phosphate, drs	lb.	.33	.45	.33	.45	.45	.33	.45	.33
Triphenyl guanidine	lb.	.58	.60	.58	.60	.60	.58	.70	.58
Phosphate, drums	lb.	.60	.70	.60	.70	.70	.60	.75	.60
Tripoli, 500 lb bbls	100 lb.	.75	2.00	.75	2.00	2.00	1.75	2.00	1.75
Tungsten, Wolframite,	per unit	11.00	11.75	11.00	11.75	.....	.....	.....	.....
Turpentine carlots, bbls	gal.	.36½	.36½	.36½	.57	.61½	.41	.65	.51¼
Wood Steam dist. bbls	gal.	.38	.40	.38	.61	.52	.36	.57	.49
Urea, pure, 112 lb cases	lb	.15	.17	.15	.17	.17	.15	.30	.15
Fert. grade, bags c.i.f.	ton	....	82.60	.....	82.60	108.00	108.00	105.00	98.00
c. i. f. S. points	ton	.....	82.60	.....	82.60	109.30	109.30	106.30	99.30
Valonia Beard, 42%, tannin bags	ton	38.00	40.00	38.00	40.00	40.00	39.50	55.00	42.00
Cups, 30-31% tannin	ton	24.00	25.00	24.00	25.00	27.00	24.00	35.00	30.00
Mixture, bark, bags	ton	30.00	31.00	30.00	31.00	32.50	30.00	43.00	35.00
Vermillion, English, kegs	lb..	1.75	1.80	1.75	1.80	2.05	1.75	2.05	2.00
Vinyl Chloride, 16 lb cyl	lb.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Wattle Bark, bags	ton	34.50	36.00	34.50	41.00	47.75	40.00	49.75	43.50
Extract 55%, double bags ex-dock	lb.	.05	.06½	.05	.06½	.06½	.05⅞	.06½	.06½
Whiting, 200 lb bags, c-1 wks	100 lb.	.....	1.00	.....	1.00	1.00	1.00	1.25	1.00
Alba, bags c-1 NY	ton	.....	13.00	.....	13.00	13.00	13.00	13.00	13.00
Gilders, bags c-1 NY	100 lb.	.....	1.35	.....	1.35	1.35	1.35	1.35	1.35
Xylene, 10 deg tanks wks	gal.	.....	.28	.....	.28	.31	.28	.33	.33
Commercial, tanks wks	gal.	.24	.25	.24	.30	.33	.25	.32	.30
Xylidine, crude	lb.	.36	.37	.36	.37	.38	.37	.38	.38

Zinc

Zinc Ammonium Chloride powd., 400 lb bbls	100 lb.	5.25	5.75	5.25	5.75	5.75	5.25	5.75	5.25
Carbonate Tech, bbls NY	lb.	.10½	.11	.10½	.11	.11	.10½	.11	.10½
Chloride Fused, 600 lb drs. wks	lb.	.05¾	.06	.05¾	.06	.06	.05¾	.06	.05¾
Gran., 500 lb bbls wks	lb.	.05¾	.06	.05¾	.06	.06½	.05¾	.06½	.06½
Soln 50%, tanks wks	100 lb.	2.25	3.00	2.25	3.00	3.00	2.25	3.00	3.00
Cyanide, 100 lb drums	lb.	.38	.39	.38	.39	.41	.38	.41	.40
Dithiofuroate, 100 lb dr	lb.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Dust, 500 lb bbls c-1 wks	lb.	.0560	.0585	.0560	.07	.11	.06	.08¼	.08¼
Metal, high grade slabs c-1 NY	100 lb.	4.20	4.25	3.60	4.45	6.45	4.10	6.45	6.45¼
Oxide, American bags wks	lb.	.06½	.07	.06½	.07	.07¼	.06½	.07¼	.07
French, 300 lb bbls wks	lb.	.09¾	.11¾	.09¾	.11¾	.11¾	.09¾	.11¾	.09¾
Perborate, 100 lb drs	lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Peroxide, 100 lb drs	lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Stearate, 50 lb bbls	lb.	.19	.22	.19	.23	.26	.20	.26	.25
Sulfate, 400 bbl wks	lb.	.03	.03½	.03	.03½	.03½	.03	.03¾	.03
Sulfide, 500 lb bbls	lb.	.16	.16½	.16	.16½	.32	.16	.32	.30
Sulfocarbolate, 100 lb keg	lb.	.28	.30	.28	.30	.30	.28	.30	.28
Zirconium Oxide, Nat. kegs	lb.	.02½	.03	.02½	.03	.03	.02½	.03	.02½
Pure kegs	lb.	.45	.50	.45	.50	.50	.45	.50	.45
Semi-refined kegs	lb.	.08	.10	.08	.10	.10	.08	.10	.08

Oils and Fats

Castor, No. 1, 400 lb bbls	lb.	.11	.11½	.11	.12	.13½	.11½	.13½	.13
No. 3, 400 lb bbls	lb.	.10½	.11	.10½	.11¾	.13	.11	.13	.12½
Blown, 400 lb bbls	lb.	.13¾	.14	.13¾	.14	.15	.12	.15	.14
China Wood, bbls spot NY	lb.	.07	.07½	.07	.07½	.13	.07	.16	.14½
Tanks, spot NY	lb.	.06½	.06½	.06	.07	.11⅜	.06	.15	.13½
Coast, tanks,	lb.	.05¾	.06½	.05½	.06½	.10½	.05½	.14½	.12½
Cocoanut, edible, bbls NY	lb.	.....	.10¾	.....	.10¾	.10¾	.10¾	.10¾	.10¾
Ceylon, 375 lb bbls NY	lb.	.06½	.06½	.06½	.06½	.08¼	.06¾	.09¼	.07¾
8000 gal tanks NY	lb.	.04½	.05	.04½	.06	.07	.05½	.08¾	.06¾
Cochin, 375 lb bbls NY	lb.	.06¾	.07	.06¾	.07	.09¼	.07¼	.10	.09¾
Tanks NY	lb.	.05¾	.05¾	.05¾	.05¾	.08¼	.07	.09¼	.08¾
Manila, bbls NY	lb.	.06¼	.07	.06¼	.07	.08¼	.06¼	.09¼	.07¾
Tanks NY	lb.	.03⅜	.05½	.03⅜	.05½	.07¼	.05¼	.08¼	.06¼
Tanks, Pacific Coast	lb.	.03¼	.04	.03¼	.05	.07	.05½	08	.06¼

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Animal Fats:		
Lard, neutral	5,105,257	1,884,176
Lard, other edible	402,975,568	3,258,398
Tallow, edible	16,595,441	19,230,489
Tallow, inedible	133,884,969	140,606,075
Neat's-foot oil	1,026,605	1,090,207
Greases:		
White	16,170,005	10,057,424
Yellow	20,658,402	8,352,824
Brown	13,194,087	14,112,448
Bone	7,694,130	91,774
Tankage	12,059,219	138,118
Garbage or house	19,103,569	19,792,868
Wool	2,683,077	1,091,957
Recovered	749,280	369,496
All other	2,672,955	1,708,225
Other Products:		
Lard compounds and other lard substitutes	278,215,970	188,835
Hydrogenated oils	155,030,585	140,119,588
Stearin, vegetable	4,567,389	3,869,488
Stearin, animal, edible	12,781,081	9,391,917
Stearin, animal, inedible	3,214,256	4,342,636
Oleo oil	28,568,672	7,932,502
Lard oil	5,55[illegible],347	2,885,942
Tallow oil	1,975,044	2,923,602
Fatty acids	34,052,589	36,618,842
Fatty acids, distilled	16,396,561	15,779,773
Red oil	8,255,104	5,946,760
Stearic acid	6,656,355	2,059,010
Glycerin, crude 80% basis	35,178,569	37,303,049
Glycerin, dynamite	10,748,234	4,567,768
Glycerin, chemically pure	19,132,510	2,501,647
Cottonseed foots, 50% basis	25,552,919	39,787,210
Cottonseed foots, distilled	19,602,625	20,251,045
Other vegetable oil foots	15,155,193	11,710,295
Other vegetable oil foots, distilled	1,115,586	926,160
Acidulated soap stock	10,459,426	12,102,802
Miscellaneous soap stock	510,176	485,612

Imports of Foreign Fats and Oils, Quarter Ended June 30, 1931

Kind	*Pounds*
Animal oils & fats, edible	748,598
Whale oil	86,573,040
Cod oil	3,523,440
Cod-liver oil	3,139,830
Other fish oils	3,973,785
Tallow	121,641
Wool grease	1,358,749
Stearic acid	1,604,324
Grease and oils, n. e. s. (value)	$27,967
Olive oil, edible	20,725,355
Peanut oil	5,994,692
Sunflower seed oil	25,801,963
Palm oil	63,760,557
Other edible vegetable oils	2,789,619
Tung oil	20,381,726
Coconut oil	73,832,195
Sulfur oil or olive foots	10,260,492
Other olive oil, inedible	3,985,579
Palm-kernel oil	3,533,977
Sesame oil	120
Cornauba wax	2,528,990
Other vegetable wax	683,067
Rape (colza) oil	3,556,088
Linseed oil	124,586
Soya-bean oil	781,527
Perilla oil	6,351,639
Other expressed oils	1,128,291
Glycerin crude	2,389,755
Glycerin, refined	179,946

Exports of Domestic Fats and Oils, Quarter Ended June 30, 1931

Kind	*Pounds*
Oleo oil	12,067,954
Oleo stock	2,029,831
Tallow	726,265
Lard	122,177,703
Lard, neutral	2,314,541
Lard compounds, containing animal fats	499,385
Oleo stearin	2,142,336
Neat's-foot oil	240,090
Other animal oils, inedible	467,154
Fish oils	337,378
Grease stearin	799,082
Oleic acid, or red oil	211,912
Stearic acid	114,628
Other animal greases & fats	18,445,405
Cottonseed oil, crude	1,977,960
Cottonseed oil, refined	3,732,251
Coconut oil, crude	3,555,869
Coconut oil, refined	1,006,345
Corn oil	232,922
Soya-bean oil	999,017
Vegetable oil lard compounds	1,191,657
Other edible vegetable oils and fats	586,953
Linseed oil	345,062
Other expressed oils and fats, inedible	375,409
Vegetable soap stock	7,447,344
Glycerin	85,216

	Current Market	1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Cod, Newfoundland, 50gal bbls ....gal.	.....	.38	.38	.48	.56	.46	.64	.57½
Tanks NY....gal.	.....	.36	.36	.45	.62	.48	.60	.60
Cod Liver see Chemicals.....								
Copra, bags....lb.	.0225	.0275	.0225	.0325	.046	.039	.05½	.042
Corn, crude, bbls NY....lb.	.07	.09	07	.09	.10	.08½	.10¾	.09½
Tanks, mills....lb.	.....	.06½	.05½	.07½	.08	.06½	.09½	.07½
Refined, 375 lb bbls NY....lb.	.10½	.10½	.10¼	.10½	.10½	.09½	.11¼	.10¼
Tanks....lb.	.08½	.08½	.08	.08¾	.10	.08	.11	.09
Cottonseed, crude, mill....lb.	.....	.04½	.04⅝	.07	.07½	.06½	.09	.08⅜
PSY, Sept.1, 100lb bbls spot.lb.	.051	.055	.051	.09	.088	.076	.1075	.085
Degras, American, 50 gal bbls NY....lb.	.04½	.04½	.04	.04½	.04½	.03½	.05	.03½
English, brown, bbls NY....lb.	.04½	.05	.04¼	.05	.05	.04¼	.05⅜	.04¼
Light, bbls NY....lb.	.05	.05½	.05	.05½	.05½	.05	.05⅜	.05
Dog Fish, Coast Tanks....gal.	.....	.32	.....	.32	.34	.32		

Greases

Greases, Brown....lb.	.04½	.04½	.03⅞	.04¼	.06½	.04	.08½	.06
Yellow....lb.	.04½	.05	.03	.05	.07½	.03⅞	.08½	.06½
White, choice bbls NY....lb	.04	.04½	.04	.05¼	.08½	.06	.11½	.07½
Herring, Coast, Tanks....gal.	.....	Nom.	.....	Nom.	.....	.....		
Horse, bbls....lb.	.05½	Nom.	.05½	Nom.	Nom.	.05½	Nom.	.....
Lard Oil, edible, prime....lb.	.....	.11⅜	.11¾	.13	.13½	.12½	.15½	.14⅜
Extra, bbls....lb.	.....	.08½	.08½	.10	.12	.10	.13½	.12
Extra No. 1, bbls....lb.	.....	.07⅜	.07⅜	.09¾	.11	.09¾	.13½	.11⅜
Linseed, Raw, five bbl lots...lb.	.085	.093	.085	.102	.146	.096	.162	.105
Bbls c-l spot....lb.	.081	.091	.081	.098	.142	.092	.158	.101
Tanks....lb.	.075	.083	.075	.092	.134	.086	.15	.093
Menhaden Tanks Baltimore.gal.	.....	.17½	.17½	.22	.50	.21	.52	.45
Extra, bleached, bbls NY..gal.	.44	.45	.44	.53	.70	.52	.70	.70
Light, pressed, bbls NY...gal.	.33	.34	.33	.38	.64	.36	.64	.63
Yellow, bleached, bbls NY.gal.	.36	.37	.36	.42	.67	.38	.67	.66
Mineral Oil, white, 50 gal bbls ....gal.	.40	.60	.40	.60	.60	.40	.60	.40
Russian, gal....gal.	.95	1.00	.95	1.00	1.00	.95	1.00	.95
Neatsfoot, CT, 20° bbls NY .lb.	.13¼	.14	.13¼	.16	.17⅜	.16½	.19	.18½
Extra, bbls NY....lb	.07	.08	.07	.10	.11⅜	.09½	.13½	.12
Pure, bbls NY....lb.	.09½	.09¾	.09½	.12	.13½	.11½	.15¼	.13½
Oleo, No. 1, bbls NY....lb.	.....	.06⅝	.06⅝	.08	.12½	.08⅞	.11½	.10¾
No. 2, bbls NY....lb.	.....	.05¾	.05¾	.08	.11	.08⅛	.11½	.10
No. 3, bbls NY....lb.	.....	.06¼	.06¼	.09	.10½	.09	.10⅜	.09¾
Olive, denatured, bbls NY...gal.	.77	.80	.77	.80	1.00	.70	1.40	1.05
Edible, bbls NY....gal.	1.50	2.00	1.50	2.00	2.00	1.75	2.00	1.95
Foots, bbls NY....lb.	.06½	.06¾	.06½	.06¾	.08	.06	.11½	.08½
Palm, Kernel, Casks....lb.	.04½	.05	.04½	.06¼	.08½	.06	.09	.08
Lagos, 1500 lb casks....lb.	.05	.06	.05	.06	.07¾	.05½	.09	.07½
Niger, Casks....lb.	.04	.04½	.03⅞	.05½	.07½	.05½	.08¼	.07
Peanut, crude, bbls NY....lb.	.....	.05	.05	.05	Nom.	.....	Nom.	.....
Refined, bbls NY....lb.	.11	.12½	.11	.14	.15	.12	.15	.14½
Perilla, bbls NY....lb.	.08	.09	.08	.11	.14½	.10	.20	.15
Tanks, Coast....lb.	.....	.06½	.05⅞	.09	.11½	.08	.15⅜	.13
Poppyseed, bbls NY....gal.	1.70	1.75	1.70	1.75	1.75	1.70	1.75	1.70
Rapeseed, blown, bbls NY...gal.	.71	.73	.71	.73	1.00	.74	1.04	1.04
English, drms. NY....gal.	.....	.75	.....	.75	.82	.75	.90	.82
Japanese, drms. NY....gal.	.56	.58	.56	.58	.70	.56	.88	.72
Red, Distilled, bbls....lb.	.07⅞	.08	.07⅞	.09	.10⅜	.08⅜	.11⅞	.10¼
Tanks....lb.	.....	.07	.07	.08¼	.09½	.07¼	.10½	.09½
Salmon, Coast, 8000 gal tks..gal.	.....	.22	.22	.22	.44	.42	.44	.42
Sardine, Pacific Coast tks...gal.	.18	.19	.18	.19	.42	.18	.51	.45
Sesame, edible, yellow, dos...lb.	.09½	.10¾	.09½	.10¾	.12	.09	.12	.11½
White, dos....lb.	.....	.12	.10	.12	.12½	.10	.12½	.12½
Sod, bbls NY....gal..	.....	.40	.....	.40	.40	.40	.40	.40
Soy Bean, crude.....								
Pacific Coast, tanks....lb.	.06	.07	.06	.08	.09¼	.07	.10⅞	.09
Domestic tanks, f.o.b. mills, ...lb.	.055	.06	.055	.07	.08½	.07	.10¼	.08½
Crude, bbls NY....lb.	.071	.08	.071	.08	.10¾	.10	.12¾	.11⁷
Tanks NY....lb.	.065	.07	.065	.08	.09¾	.09	.11¼	.10½
Refined, bbls NY....lb.	.08	.09	.08	.09	.13½	.13	.13½	.13½
Sperm, 38° CT, bleached, bbls NY....gal.	.77	.79	.77	.85	.85	.84	.85	.84
45° CT, bleached, bbls NY gal.	.72	.74	.72	.80	.80	.79	.80	.79
Stearic Acid, double pressed dist bags....lb.	.08½	.09	.08½	.11	.15	.13½	.18½	.15½
Double pressed saponified bags ....lb.	.08½	.09	.08½	.12	.15½	.14½	.19	.15½
Triple, pressed dist bags..lb	.11	.11½	.11	.14	.17	.15½	20½	.17½
Stearine, Oleo. bbls....lb.	.08¼	.08½	68½	.08¾	.09½	.08¼	.12	.09½
Tallow City, extra loose....lb.	.03½	.04	.03½	.04	.07⅜	.04¼	.08⅜	.07
Edible, tierces....lb.	.04	.04½	.04	.06	.09½	.05½	.10½	.08
Tallow Oil, Bbls, c-1 NY..lb.	.07	.07½	.07	.08¼	.11	.08½	.12	.10¾
Acidless, tanks NY....lb.	.07⅞	.09	.07⅞	.09	.10	.08¼	.11	.09¼
Vegetable, Coast mats....lb.	.06	Nom.	.06½	Nom.	Nom.	.06½	Nom.	.08
Turkey Red, single bbls....lb.	.08⅝	.09	.08⅝	.10	.12	.10	.12	.11
Double, bbls....lb.	.10	.12	.12	.10	.16	.13	.16	.14
Whale, bleached winter, bbls NY....gal.	.....	.74	.....	.74	.74	.74	.80	.74
Extra, bleached, bbls NY..gal.	.....	.68	.66	.77½	.76	.76	.82	.76
Nat. winter, bbls NY....gal.	.....	.65	.63	.72	.73	.73	.78	.73

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"We"—Editorially Speaking

Drawing upon his experience of 31 years in the chlorine derivatives field, Thomas Coyle, service engineer for R & H, gives some interesting facts about trichlorethylene, one of the newer chlorinated solvents. Mr. Coyle's experience includes the production, sales, and servicing of chlorine products. Back in 1902 he was engaged in the first large scale manufacture of chloroform in this country—in the Niagara Falls plant of R & H. Five years later, he left the company to study chemistry at Lehigh, from where he was graduated in 1909. Upon leaving school he joined the Niagara Falls plant in charge of the production of chlorine products. From then until 1922, he was actively connected with the production and servicing of the many products in this group. In that year, however, he organized a new department to specialize in the servicing of these products, a change made necessary by the increasing industrial importance of chlorine and its derivatives. This department is now known as the sales service department. In his new work, he has developed servicing methods for at least three of the chlorine products—chloroform, trichlorethylene and methyl chloride. Many of the methods which he fostered have been adopted as standard methods in the modern merchandising of chemicals. In recognition of his contributions to refrigeration, Mr. Coyle was appointed a member of the research committee of the American Society of Refrigerating Engineers. He is also a Director of the Chlorine Institute and although a busy man, still finds time for golf and bowling.

Associated with Coyle in the preparation of the trichlorethylene article was Paul J. Carlisle. During nineteen years of research and development chemistry, Carlisle, manager of the chemical department, R & H Niagara Falls plant has been in intimate contact with the manufacture and research investigation of chlorine derivatives, cyanides and a variety of other industrial chemicals. Original work on the manufacture, properties and characteristics of chlorine compounds, especially trichlorethylene, has been done under his direction. Also, he has been instrumental in developing a number of new processes for the production and utilization of industrial chemicals. Except for the early years following his graduation (Indiana University, 1913: *Magna cum laude*, Phi Beta Kappa and other scholastic distinctions) he has been connected with R & H in several different capacities in its different plants. From 1916, he spent several years in research and development work at Perth Amboy. In 1918 he was transferred to the plant at St. Albans, W. Va., where he served as process manager and assistant works manager. In 1921 he went to El Monte, as assistant works manager of the R & H plant there, remaining until 1926. In that year he became research supervisor of Niagara operations and in 1928 he was made director of the chemical research department. In the latter part of 1930 he assumed his present position as manager of the chemical department.

COMING FEATURES

S. J. Cook Canadian National Research Council, whose article "Recent Chemical Developments in Canada" was originally scheduled for September, is recovering from his recent automobile accident. He promises delivery in time for October. Those who were fortunate enough to have read previous articles by him will see to it that they do not miss this one.

D. L. Jacobson's (Koppers) "New By-Products from Gas" is a real contribution to the techno-economic chemical literature. It is equally as important as the "Trichlorethylene" article in this month's issue.

Quicksilver has dropped 27 per cent in price since the first of this year. Who is better qualified to tell us why than Charles S. Wehrly (Henry A. Peabody)?

Between airplane jumps, Luther Martin, IV, secretary Wilckes, Martin and Wilckes is completing his article on the lampblack industry.

"What do Investment Trusts Think of the Chemical Industry"? Fred A. Hessel makes an interesting survey of chemical holdings in the portfolios of leading investment trusts.

In Plant Management, Dr. G. A. Perley explains, "Control Methods in Chemical Operations."

The dock racketeers have been plying their trade in chemical circles, and if you have any executives going to Europe, you had best watch out. Their game is to telephone to a man's secretary the day after his departure for Europe and to say that they have certain packages held at the dock, which he has purchased and which they are to deliver C. O. D. Sometimes they vary the technique by delivering a faked radiogram from the absent executive. In all cases, the cases in question are filled with water bottles. They failed dismally to fool Innis, Speiden, because Mr. Sheffield doesn't use such goods, but they snagged $1200 out of the secretary of the big, handsome president of one of the fine chemical companies.

Robert G. Quinn who takes us behind the scenes of the insulated wallboard industry to point out pleasant prospects for the consumption of industrial chemicals is a Notre Dame man of the class of 1922, who decided that while the Middle West was the place to attend school back home East was the place to find a job. After a year with Westinghouse Lamp, he entered the commercial department of American Cyanamid devoting his efforts to sales development work on calcium cyanide for insecticide purposes. However, the laboratory desk had more appeal and he finally decided to continue some work started in college—synthetic wallboard. The past five or six years have been devoted to this specialty, the last two with the International Paper Co. at its Glens Falls, N. Y., laboratories. His most serious dissipation is risking (?) a week's salary on the Notre Dame Eleven when it plays Army.

We received the following from Carl Hazard and it warmed our heart for he is noted for his keen discrimination and outspokenness in the matter of trade publications.

"We congratulate—

Your introduction and the handling of the "We Congratulate" column in the August issue.—You for the very interesting article, "Business Today and Always" by Mr. Hasslacher, and your genial reference to the author "We" in the "We" page.—The subscribers and advertisers of CHEMICAL MARKETS, whose encouragement and support makes such an interesting publication possible."